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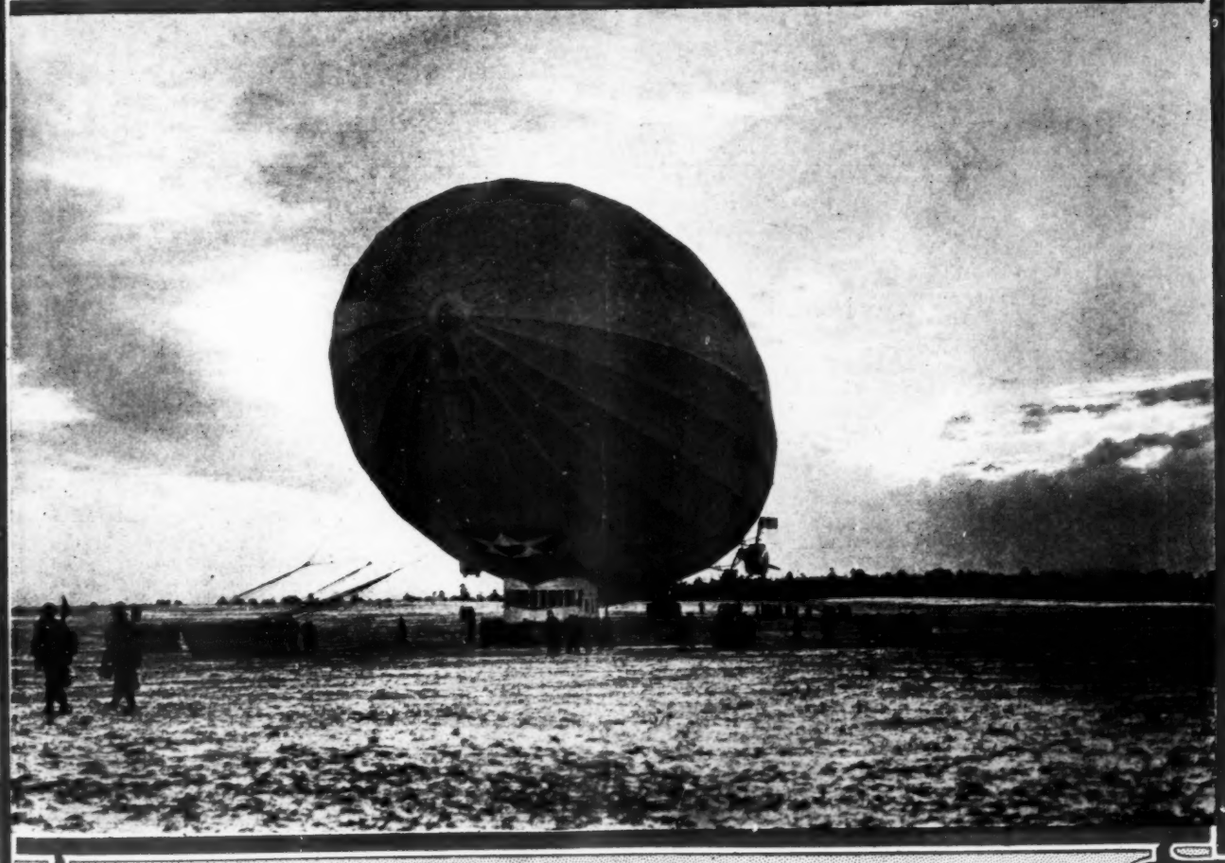

The ground crew towing the Los Angeles to its hangar at Lakehurst, N. J.

VOLUME XXIV

NUMBER 12

Special Features

The Laird "Whippoorwill"
Airplane Tires and Inner Tubes
The Public Relations Counsel in Aeronautics

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250 WEST 57 STREET, NEW YORK

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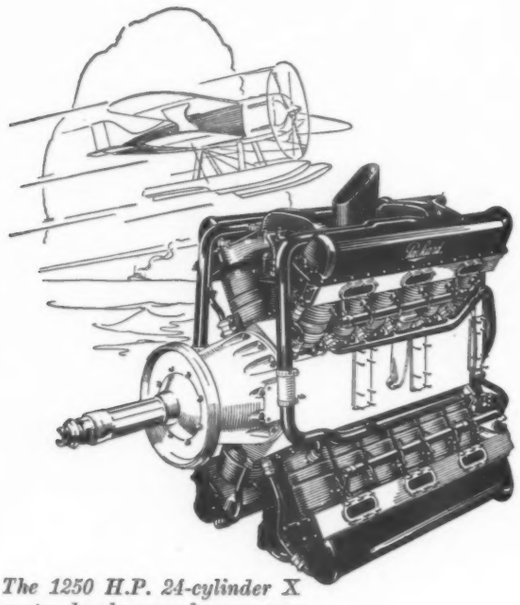

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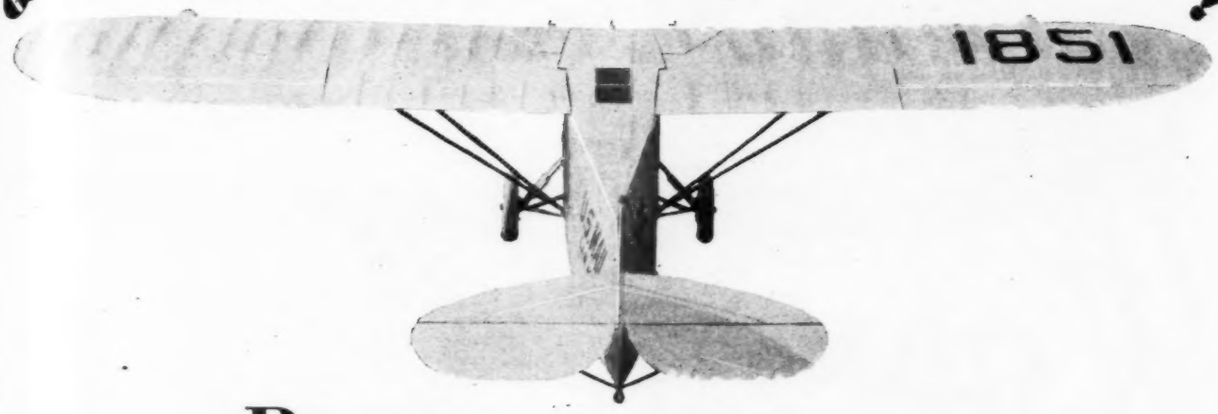

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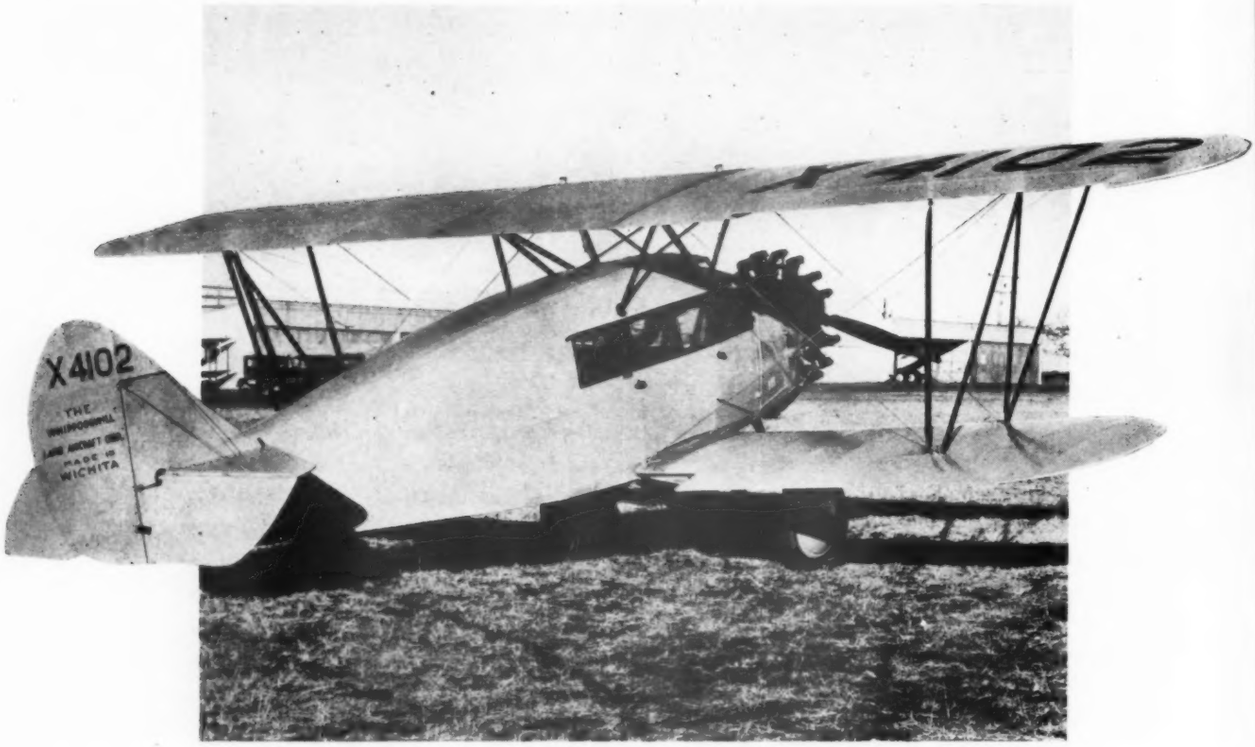

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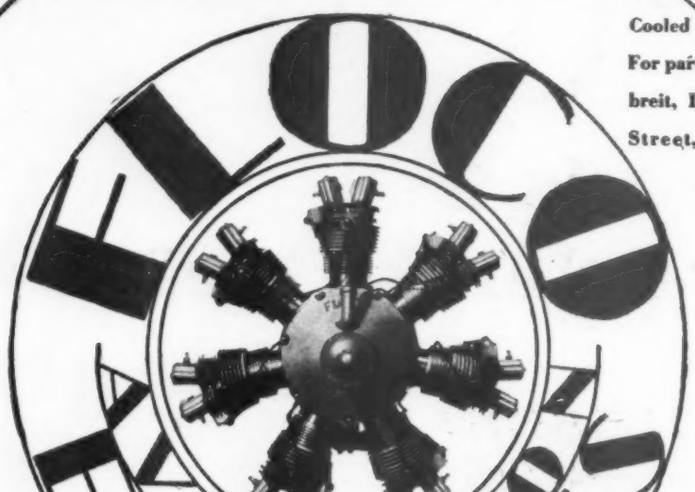

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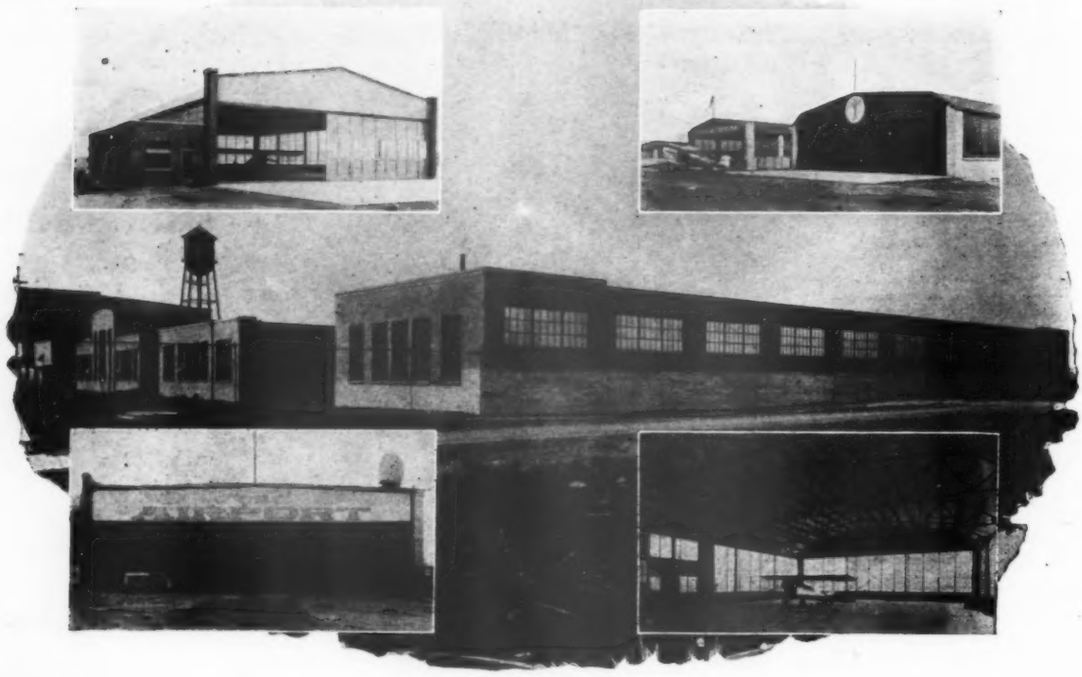

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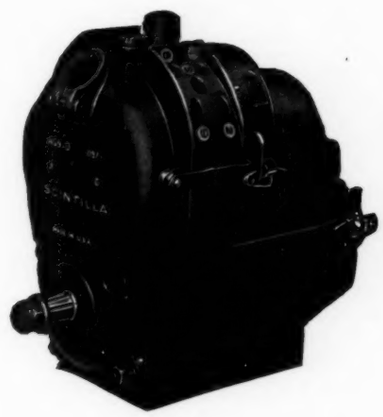

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AVIATION

The Oldest American Aeronautical Magazine

Vol. XXIV *MARCH* 19, 1928 No. 12

The Controversy Becomes Clearer

ALL THAT Mr. Wright has to do to get his plane into the Smithsonian Institution is to ...."Openly state in a friendly way that he appreciates that the Smithsonian Institution honestly believes that the Langley machine of 1903 was capable of sustained free flight under its own power, carrying a man." Translated into plain English and stripped of its sophisms this means that Mr. Wright is supposed to announce to the world that the Langley machine antedated his own as the first successful man carrying airplane. We do not blame him for not wanting to do so.

The public is beginning to become aware of what the controversy is all about. The Smithsonian Institution in order to glorify itself has tried to deceive the world into believing that one of its members was the inventor of the first airplane to fly successfully. It is now willing to remove the placard on the Langley airplane which states that ...."In the opinion of many competent to judge, this was the first heavier-than-aircraft in the history of the world capable of free flight under its own power carrying a man." But before it will do this Mr. Wright must admit publicly that the placard is correct.

If the Institution persists in this attitude of stiffed necked pride it will alienate many friends, and an organization which was once regarded with respect by every one will be looked down on with scorn as an institution run by narrow-minded and vain-glorious bigots.

The Lion and the Lamb

TO THOSE who suffered through the lean post war days when members of the aeronautical industry had no alternative, as regards getting business, except to knife each other in the back, the convening of the Wichita Conference of Commercial Aircraft Manufacturers is a most welcomed indication of better things. However, it must not be inferred that perfect harmony has at last been achieved, for, American airmen have not as yet reached that stage of degeneracy, or mock brotherly love. But at least the Wichita Conference gives evidence that the majority of commercial manufacturers have begun to realize that they have a common cause for which it is worthwhile to sacrifice some of their individual pride and personal prejudices.

Aviation as a separate industry is growing fast and the object of the Committee elected at Wichita will be to establish continued growth upon a sounder basis. As evinced by its demands to have Lindbergh stop flying, the public has shown that it still continues to regard aviation as a dangerous stunt. To offset this point of view will require careful study in the preparation and presentation of suitable aviation propaganda, and it will prove worthwhile for every one connected with the industry to exert themselves for this common cause.

Then too, there are many practices within the industry regarding which there should be more unanimity of opinion and execution. Exaggerated performance claims should be checked; misleading advertising should be investigated and corrected; agreements and limitations regarding discounts to agents, etc, should be made and adhered to; and discussions should be held relative to shipping by freight, insurance rates, labor problems and the exporting of planes, engines, parts and equipment, etc. All of these are subjects which can be studied profitably by all and ones that will enable sub-committees to accomplish much of practical value.

The next meeting of the commercial manufacturers will probably be held at Detroit during the All-American Aircraft Show and it should be well attended. The fact that the commercial manufacturers' organization is a branch of the Aeronautical Chamber of Commerce gives it a background of solidity and experience which is valuable. Don Alexander, chairman of the committee, is a man of energy and good sense, and the members and Jack Harding, the secretary, are all men who have and will accomplish things. Therefore, there seems but little doubt that a new and powerful influence for the good of the industry has been organized.

Regularity of Instruction

THE QUESTION as to the exact number of hours that a student should receive before going solo is one that can best be decided by the instructor. But regardless of whether that number be six or twenty-six it will be to the interest of the student to take his instruction at regular intervals. Even experienced pilots admit that when they cease flying for any length of time they temporarily lose the "feel of the air". It is quite natural that in the case of the novice, long periods between flights will have an even greater effect.

Flying, like swimming, is something that we never actually forget once we have learned how it is done. It is a sort of instinct that merely becomes more and more dulled by more and more inactivity. Therefore it would seem highly advisable for flying school operators to impress upon the student the importance of taking his instruction on a regular schedule rather than in a hit and miss manner. By so doing he will minimize the chances of forgetting the knowledge that has been imparted to him by the instructor, and also the chances of going stale.

Airplane Tires *and* Inner Tubes

By CHARLES J. CLEARY
Textile Technologist for Army Air Corps

THE HISTORY of the development of airplane tires and inner tubes, although quite interesting, is not generally understood; so for the sake of general information, it is proposed to digress from the technical phases of the subject momentarily to give an insight into the reasons involved in their development.

Previous to 1920 clincher type tires and tubes were used almost exclusively on airplanes, both in this country and in Europe. There were a few instances of the use of straight side tires and tubes, noticeably on Fokker and Nieuport airplanes, but in general, the use of clincher types were almost universal. As the development of aircraft advanced, clincher tires performed more and more unsatisfactorily, not because the material and workmanship were inferior, but because the weights of airplanes, as a whole, were increasing without provision being made for the use of larger tires. The performance of clincher tires as a consequence of this overloading was unsatisfactory, and was evidenced chiefly by "blow-outs" due to rim-cutting. A great deal of unsatisfactry tire performance could have been eliminated had they not been overloaded, but clincher tires are inherently unsatisfactory when under-inflated, or when subjected to side loading, as in the case of "drift" landings. From the nature of service and maintenance conditions, these faults are always present, which fact practically forced the development of airplane tires and tubes along the lines of the straight side or bead.

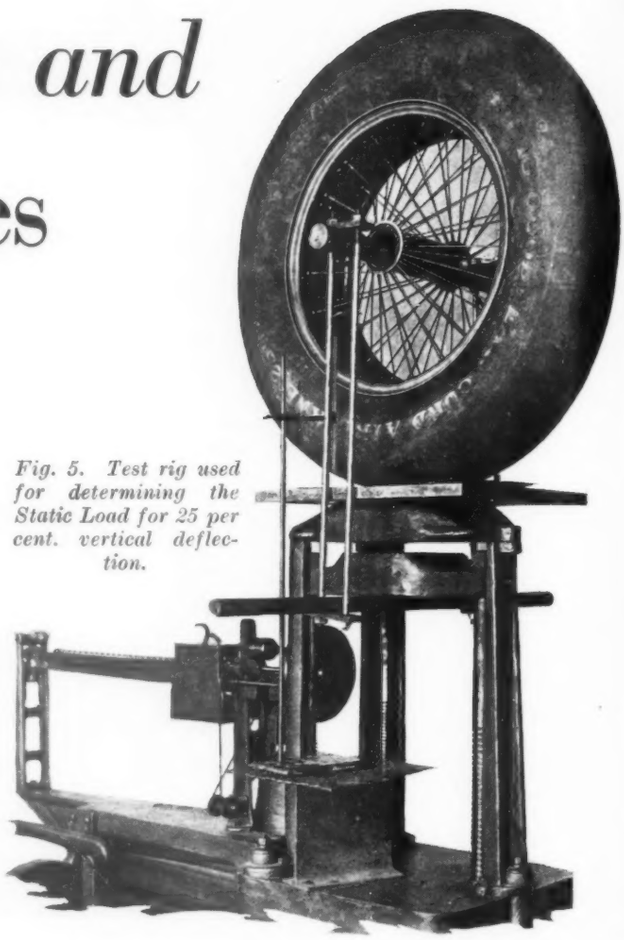

Fig. 5. Test rig used for determining the Static Load for 25 per cent. vertical deflection.

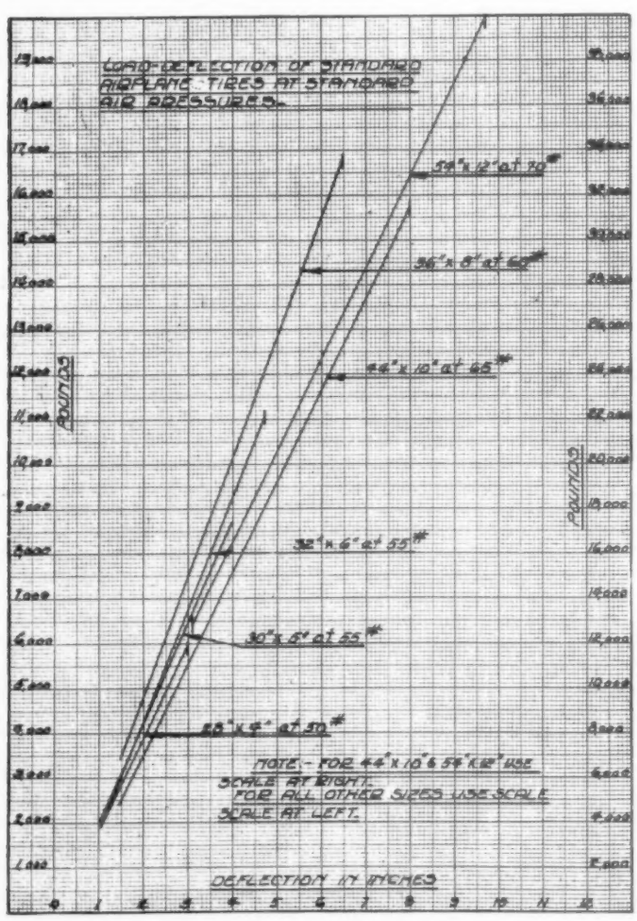
LOAD-DEFLECTION OF STANDARD AIRPLANE TIRES AT STANDARD AIR PRESSURES
30"x 6" at 55#
30"x 6" at 65#
28"x 4" at 50#
NOTE:- FOR 44"x 10" & 54"x 12" USE SCALE AT RIGHT. FOR ALL OTHER SIZES USE SCALE AT LEFT.
DEFLECTION IN INCHES
POUNDS

Fig. 1. Load deflection of standard airplane tires at standard air pressures.

The general features which were considered in the design of airplane tires and tubes of the straight side type were:

(a) The tire sizes should be such that they would cover the complete range of airplane weights; that is, two tires should be capable of sustaining airplanes ranging in weight from 500 to 20,000 lbs.

(b) The design should be such that "rim-cutting" would be eliminated, as far as possible, and that the effect of over-loading the tire be such as to cause the least possible damage to the plane and the tire.

The design of an airplane casing differs in a number of features from the design of an automobile casing. An automobile casing must be designed to support the necessary load, have sufficient flexibility to accommodate the low inflation pressures used in the present balloon tires, and must have a tread of highly compounded rubber built to withstand the abrasive effects of the hard surfaced roads over which they operate. This highly compounded tread also necessitates the use of a "breaker" fabric and a "cushion" of lively rubber for the protection of the main fabric carcass of the tire and to permit

of better adhesion between the tread and the carcass. An airplane casing functions on an entirely different type of surface, usually a soft or grass surface, and there is little or no abrasive action on its tread. In addition, the fact that the airdrome surfaces and the fields from which airplanes operate are often very soft and muddy, especially in the spring and fall, necessitates using a very flexible tire with low inflation pressures, to obtain the largest possible "snow shoe" effect to prevent the wheels from sinking to any depth in the surface. These two conditions permit of the use of a tire consisting of only the fabric carcass, with the usual straight side beads, and a very thin rubber tread which is extended to the beads to form the side walls of the casing. This type of construction insures a casing of minimum weight, which is always desirable in any form of airplane construction or in any piece of aeronautic equipment. The results of experimental testing and development of airplane tires led to the adoption of the following specification requirements:

The casings shall consist of superimposed layers of rubberized cord fabric, applied on the bias so that all plies have a uniform angle with reference to each other. These rubberized cord fabric layers shall be laid in such a manner that an equal number of plies shall run in each diagonal direction across the casing.

The cord fabric shall be a standard cotton tire fabric and the staple, as commercially determined, shall be not less than 1 1/16 in. long. The material shall be made from the best quality fiber.

The compound used in frictioning and skim coating the cord fabric shall consist of at least 85 per cent. by volume of the best new plantation rubber, or its equivalent, suitably compounded and properly vulcanized to produce a compound which shall age well under reasonable service conditions.

The tread and the side wall shall have the following physical properties:

Tensile Strength (lb./sq. in.).....2400
Elongation, per cent..... 500
Set, per cent..... 25

All beads shall be of the straight side type, reinforced with steel wire. One chafing strip weighing not less than 14 ounces per square yard, shall be used on each bead.

The size, number of plies, minimum loads for 25 per cent. vertical deflection, minimum bursting strengths, and the weights of the casings shall conform to the values indicated in Table I.

Sufficient manufacturing tolerances are allowed in the dimensions of these casings, which are usually built about five per cent. oversize, to permit of efficient manufacturing methods.

The minimum strength of union (friction) on a specimen 1 inch wide shall be as follows:

Side Wall and Plies.....14 lbs.
Tread and Plies.....20 lbs.

All physical tests shall be made in accordance with U. S. Army Specification No. 20-1, which is the specification covering the standard methods of testing rubber materials.

The Static Load for 25 per cent. vertical deflection shall be obtained by loading the wheel and tire assembly at the axle, with the tire inflated to the pressure indicated, and noting the load required to cause the specified deflection. The vertical distance from the rim flange to the supporting surface of the tire is considered as the distance equivalent to 100 per cent. deflection. Fig. 5 shows the test rig used in this determination.

TABLE I.
Physical Data For Airplane Casings

Size	*Ply of Tire*	*Static Load for 25% Vertical Deflection-Min.*	*Service Inflation Pressure*	*Bursting Pressure Lb./Sq. In.*	*Bead Width In.*	*Max. Weight of Casing Lb.*
28 x 4	4	1200	50	150	5/8	9.0
30 x 5	4	2000	55	155	7/8	13.0
32 x 6	4	2500	55	165	7/8	18.0
36 x 8	6	4000	60	180	3/4	28.0
44 x 10	8	6500	65	195	1	60.0
54 x 12	10	10000	70	210	1 1/4	82.0

The physical testing of airplane tires is carried out in essentially the same way as the testing of automobile tires with the exception of the road tests. The material tests are made in accordance with generally accepted test methods, such as are outlined in U. S. Army Specification 20-1, previously referred to. A description of these tests is considered unnecessary in this paper.

The rim widths, A, were originally laid out to be 0.7 of the section of the tire, which would make the rim width of 4 in. rim, 2.8 in.; the 5 in. rim, 3.5 in.; the 6 in. rim, 4.2 in., etc. This proved to be unsatisfactory in a number of cases, especially for the smaller sizes. In the case of the 28x4 tire, with an original rim width of 3.0 in. and an overall width of 3 7/8 in. between the tips of the rim flanges, there was not sufficient

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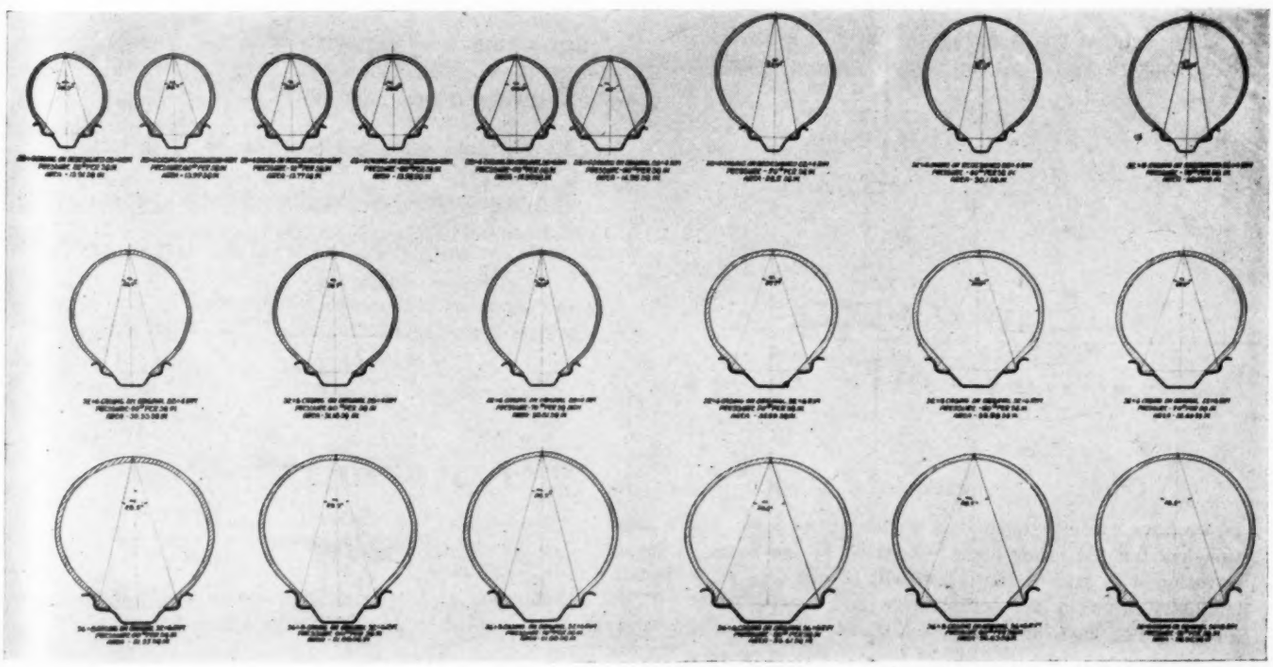


Fig. 2. Series of drawings showing th e effect of over-sizing airplane tires.

Review *of* Mechanics

Stress Analysis of Commerci al Aircraft, Chapter Number Two

By PROFESSOR ALEXANDER KLEMIN
Daniel Guggenheim School of Aeronautics
Assisted by GEORGE F. TITTERTON
Late of the Bureau of Aeronautics, Navy Department

IN THE study of beams it is necessary to know the properties of the material to be used. The deflection and bending of a beam are directly affected by the modulus of elasticity of the material. By definition the modulus of elasticity, E = Unit stress/Unit deformation.

Unit stress = P/A where P is the tensile or compressive load and A the area of the section on which it acts.

Unit deformation = e/L where e is the total elongation or shortening of a bar due to a tensile or compressive load and L is the length of the bar.

Thus $$E = \frac{P/A}{e/L} = \frac{PL}{Ae}$$

In the study of beams of homogeneous material the following conditions are assumed:

(1) The beam before loading is straight.

(2) The bending forces are applied perpendicularly to the axis of the beam.

(3) Any cross-section of a beam that is a plane before bending remains a plane after bending.

(4) Closely adjacent cross-sectional planes radiate towards a common center of curvature.

(5) The modulus of elasticity used in calculating the allowable stress is the same for the tension and compression side of the beam.

When a beam bends downward the upper surface of the beam is compressed while the lower surface is stretched. That

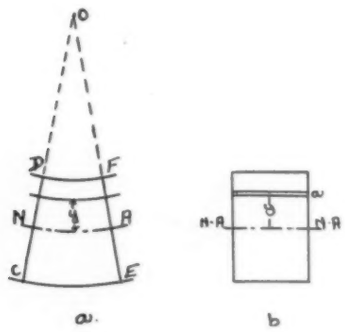


Fig. 15.

is, we have a compression load on the upper fibers and a tension load on the lower fibers. Looking at the beam in front elevation it is evident that there will be one line which is the boundary between the compressive and tensile loads. This line will not have any stress on it due to the bending and is termed the neutral axis of the beam. For symetrical beams the neutral axis is midway between the upper and lower surfaces. In Fig. 15a this is illustrated by line N-A.

In Fig. 15a C-D and E-F are two cross-sections which have remained a plane after bending and radiate towards the center of curvature O. The neutral axis N-A is the same length as in the unloaded beam. The fibers above however have been compressed to a smaller length and the fibers below N-A have been stretched. The further away from the neutral axis, the

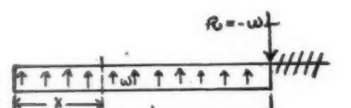


Fig. 16.

greater is the change in length and the more severely stressed are the fibers. This may be expressed by the formula:

$$f_b = \frac{E}{R} y$$

Where E = modulus of elasticity
R = radius of neutral axis i.e. N-O or A-O.
y = distance of any fiber from N-A
f_b = stress due to bending

In order to determine a relation between a bending moment M and the stress f_b produced by it, consider the elementary strip *a* (Fig. 15b) distance y from N-A and upon which the stress is f_b.

The force on this element of area is $f_b a$

Its moment about N-A = $f_b ay = \frac{E}{R} yay = \frac{E}{R} ay^2$

The total moment of the stresses for all the elementary sections is $\frac{E}{R} \varepsilon ay^2$ where the term εay^2 is the sum of all the small elements of area each multiplied by the square of its distance from the neutral axis. This term εay^2 is known as

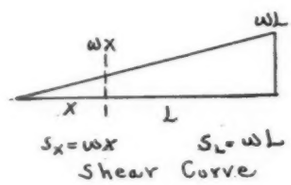


Fig. 17.

the moment of inertia of the section about the neutral axis and is denoted by I. The formula then becomes:

$$M = \frac{E}{R} I \text{ or since } \frac{E}{R} = \frac{f_b}{y} \text{ from above}$$

$$f_b = \frac{My}{I}$$

Then $M = -\frac{I}{y}$ or $f_b = \frac{}{I}$

This formula for the stress due to bending is very important and should be remembered. The values of I for various common sections will be tabulated in a later chapter.

When a load is placed on a beam shearing and bending stresses are set up in the beam. There are definite relationships between the load, shear, bending moment, slope and deflection of the beam.

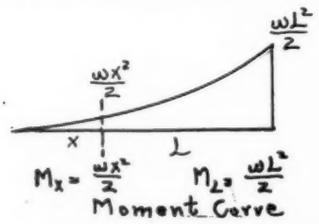


Fig. 18.

Thus shear at any section is the sum of all the forces to the left of that section. If a load diagram is drawn the shear at any section is obtained by finding the area under the load curve to the left of the section. For a uniform load this relationship may be expressed in the language of the calculus by the equation $S = \int w\,dx + c$

Moment is equal to the area of the shear diagram to the left of a section, and the mathematical expression becomes:

$M = \int S\,dx + c.$

$= \int\int w\,dx + c.$

Slope is proportional to the area of the moment diagram

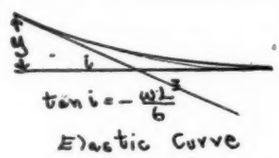


Fig. 19.

to the left of the section, and the mathematical relationship becomes:

$$EI\,(\text{slope}) = EIi = EI\frac{dy}{dx} = \int M\,dx + c = \int\int S\,dx + c$$

$$= \int\int\int w\,dx + c.$$

Deflection of any section is proportional to the area under the elastic curve of the beam to the left of the section, and the mathematical relationship is:

$EIy = \int EIi\,dx + c = \int\int\int\int w\,dx + c$ where y = deflection.

For determination of the constants the above expressions are applied to end conditions of the beam and the constants

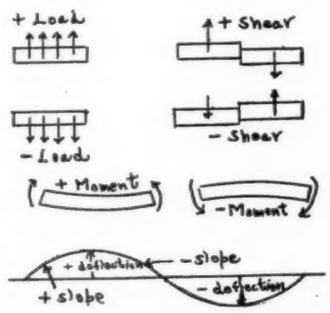


Fig. 20.

solved for. This method of determining constants will be illustrated below.

An excellent illustration of the above relationships, both graphical and mathematical is given by the case of a cantilever beam. These relations may be pictured graphically as in Figs. 16, 17, 18 and 19.

The area under the loading curve will give the shear at the right end of the beam. The area to the left of any section x will give the shear at that section. That is:

$S = \int w\,dx + c = wx + c$

When x = 0, S is 0. Therefore c must be 0.

The expression for shear then is: $S = wx$

The area of the shear curve will give the moment at the right end of the beam. The moment at any section on the beam is obtained by taking the area of the shear curve to the left of that section. Thus:

$$M = \int S\,dx + c = \int wx\,dx + c = \frac{wx^2}{2} + c$$

When x = 0, M is 0. Therefore c must be 0

Then $M = \frac{wx^2}{2}$

The slope of the curve taken by the beam is proportional

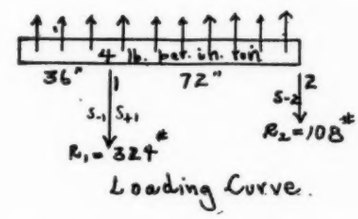


Fig. 21.

to the area under the moment curve. Then:

$$EIi = \int M\,dx + c = \int\frac{wx^2}{2}dx + c = \frac{wx^3}{6} + c.$$

At right hand end of beam i = 0 and x = L.

Then $0 = \frac{wL^3}{6} + c$ and $c = -\frac{wL^3}{6}$

Whence $EIi = \frac{wx^3}{6} - \frac{wL^3}{6}$

and when x = 0

$$i_0 = -\frac{wL^3}{6EI}$$

The deflection of any point on the elastic curve of the

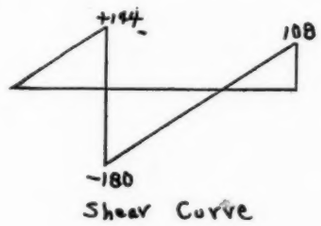


Fig. 22.

beam is proportional to the slope of the curve at that point. Thus:

$EIy = \int EIi\,dx + c$

$$y = \int i\,dx + c = \int\frac{wx^3}{6EI}dx - \int\frac{wL^3}{6EI}dx + c$$

$$y = \frac{wx^4}{24EI} - \frac{wL^3x}{6EI} + c.$$

At right hand end of beam y = 0, and x = L

Then $0 = \frac{wL^4}{24EI} - \frac{wL^4}{6EI} + c$

Continued on page 723

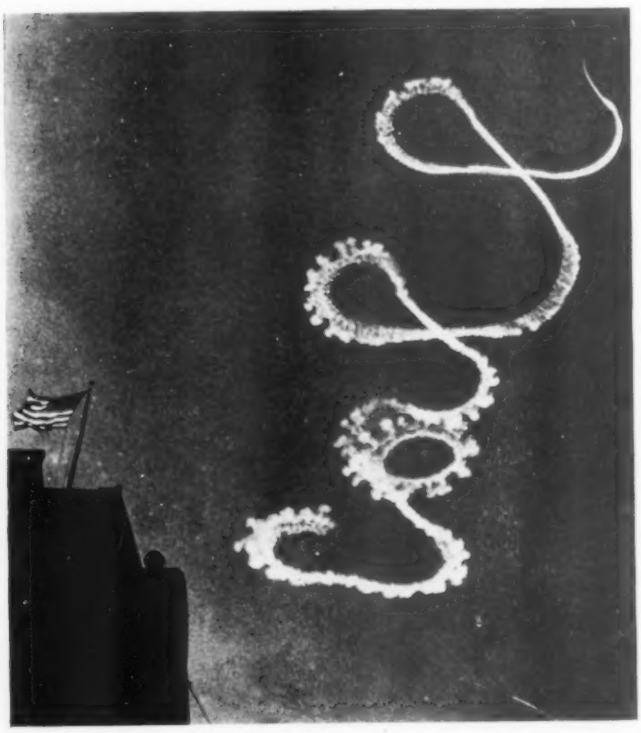
The Public Relations Counsel *in* Aeronautics

By H. A. BRUNO and R. R. BLYTHE

SOME TIME ago we were asked by a large industrial concern interested in establishing an aeronautic department in their field, as to the activities of the Public Relation Counsel in aeronautics.

"Of course," the vice-president said, "we have our own advertising agency who will take care of the routine copy. We have our sales department that will merchandise our product, but I would like to know how you secure the free publicity."

The "free publicity" he referred to was merely a misconception of the activities of the Public Relations Counsel. There is no such thing as "free publicity." All publicity costs money—the primary cost being in the investment in the product that



A plane of the Sky Writing Corporation of America wrote a phone number in the sky. The demonstration resulted in that company obtaining a $1,000,000 contract. The authors of this article were the originators of this advertising idea.

is the basis of the news. For instance if a firm builds a hundred passenger plane and upon this development secures many interesting news stories either with or without the aid of a publicity man, then the cost of the machine must be figured in the cost of the so-called "free publicity" for it has been the basic reason for the news item.

Such publicity is not free advertising. It is news. If all the copy of the advertising agencies were "put over" in the news columns, the newspapers would rapidly lose circulation. In the news columns of the daily papers editors only insert the material that in their judgment is interesting to their readers. Publicity must be news and only such publicity as is informative to the readers of the magazine or newspaper should ever be printed.

The word "news" is important. It requires special training and long experience to know how to conduct a research into the activities of a company or an individual so that the real news is revealed. Every industry, whether it be engaged in the manufacture of hairpins, bolts and nuts, or chewing gum, has its relation to the public, otherwise it could not exist. It is the presentation of this "news" in its relation to the public that creates interest and makes it important in the daily life of the individual. Newspapers, trade papers, magazines and every other medium for conveying ideas, pictures, stories, etc., exist for the purpose of informing the public. And every statement concerning an industry, or a member of that industry, must contain "news". If it does not contain "news", even if it is printed, it will not be read.

An Intermediary Between Client and Public

So many executives are prone to believe that the scope of the Public Relations Counsel covers only the editorial field. But the members of this profession have gone far beyond the former barriers of publicity work. Today the Public Relations Counsel acts as an intermediary between the client and the public. The work covers counsel and advice in the appropriate use of advertising in newspapers and magazines—billboards—in publicity—the radio—motion pictures—printed matter—the lecture platform, and, for the dissemination of information to the public, through schools, clubs and societies, labor and political organizations.

The aircraft manufacturer as a client receives information compiled on all public phases of his business gathered through statistics compiled by the government department of aeronautics, by aircraft trade magazines, by newspapers, by business periodicals, by statistical organizations and by libraries. From this report is drawn a suggested plan for the merchandising which would include such of the aforementioned channels of communication as were deemed advisable.

The advantage of such a survey is of great importance to the aircraft manufacturer, as it brings to him the observations of a completely disinterested organization. It reflects a condition which otherwise might be distorted by a member of the manufacturer's company with too close an association to his subject.

Each of our company's clients at the end of the year received a report of the past twelve months work, and at the same time they found this report preceded by an analysis for 1928. Our survey showed that advertising in the aircraft

Continued on page 722

The Laird "Whippoorwill"

New Closed Cabin, Three Passenger Biplane Powered With a Wright Whirlwind has a Top Speed of 125 M.P.H.

THE "WHIPPOORWILL", the first product of the Laird Aircraft Corp. of Wichita, Kan., was recently completed and put through preliminary flight tests successfully. It is a closed cabin biplane powered with a Wright Whirlwind engine and designed to carry a useful load of 1000 lb., or three passengers and pilot. The Whippoorwill is stated by the manufacturer to have a top speed of 125 m.p.h. with a landing speed of 40 m.p.h., and to take off after a run of about 450 ft. and climb to 10,000 ft. in 15 min.

It is of the conventional design, having wooden wings and welded steel fuselage covered with fabric. The wing cellule has a single bay with a wide center section. The upper wing is somewhat larger than the lower one both in span and in chord. The trailing edge of the lower wing is directly below that of the upper wing and due to its shorter chord gives a sort of effective stagger. Both outboard interplane and center section struts slope outward from the fuselage. The outboard struts slope outward to support the overhang of the upper wing while the center section struts support a wide center section carrying a gasoline tank that feeds to the engine by gravity. In addition to the center section struts at each side there is an additional brace in the plane of each wing spar supporting the sides of the center section to the center of the top of the fuselage. With single streamline wires between the wings at the spars and additional flying wires from the outboard strut points of the upper wing to front end of the lower longeron, the Whippoorwill has what appears to be a very rigid wing structure.

Internally the wing is of conventional design, having solid wood spars routed out for lightening. The ribs are of the web type with the leading edge reinforced with plywood on both top and bottom to insure the correct wing profile. The drag bracing consists of round tie rods. The wings are wired for both landing and navigation lights, which are standard equipment on all Laird planes.

Fuselage Deep at the Cabin

The fuselage is quite deep at the cabin, having a very good streamline form with a minimum of projections to disturb the flow of air over it. The sides are slightly rounded with the bottom almost flat and the top having a very pronounced curve, being much higher at the center than at the sides. The only break in the streamline form of the fuselage is in the front of the cabin where the depth of the fuselage is decreased rapidly to provide vision forward for the pilot. This forms a

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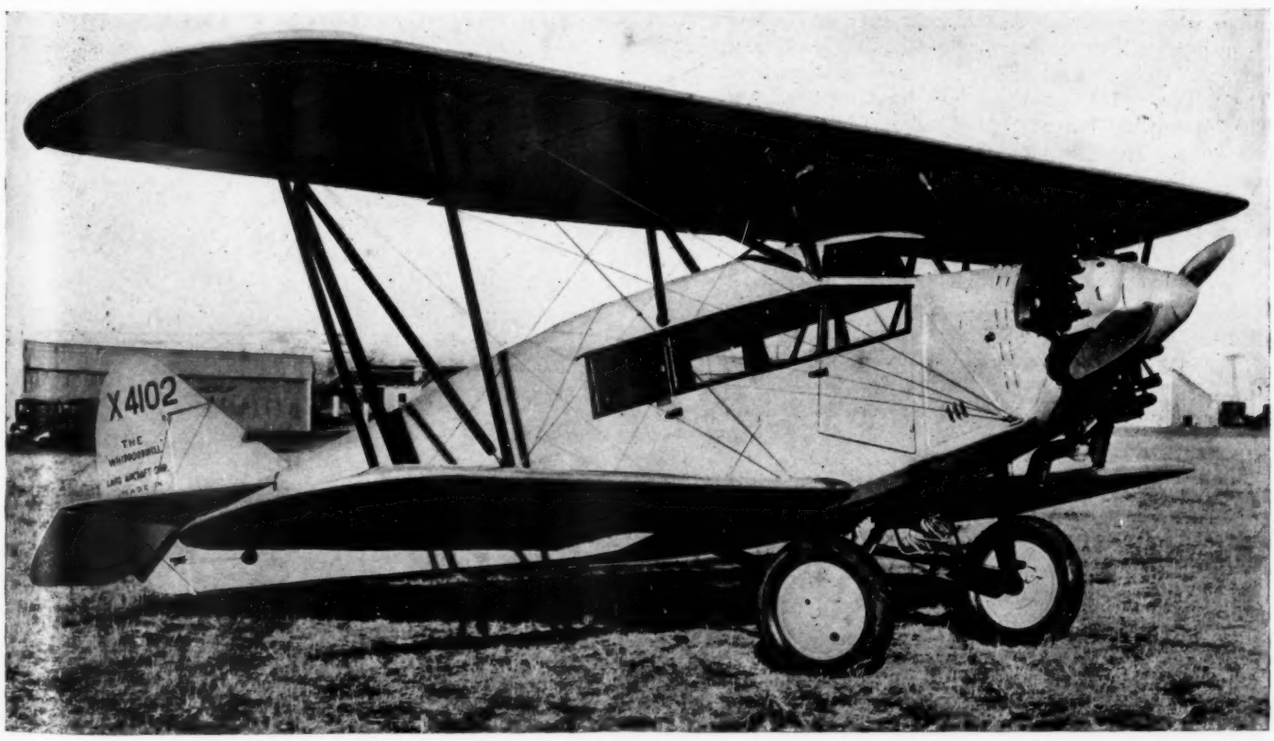


Front quarter view of the Laird "Whippoorwill" powered with a Wright Whirlwind engine.

The Heinkel H.D.40

A German Freight and Express Plane Which is to be Manufactured in This Country and Powered with an American Engine

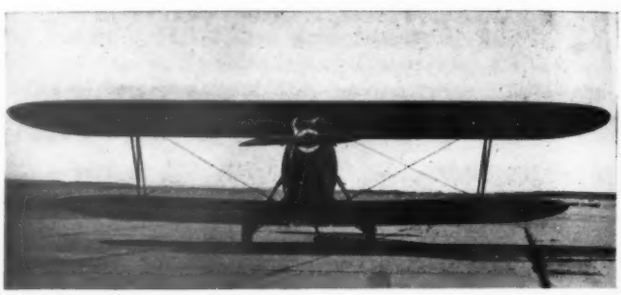
THE ARKANSAS AIRCRAFT CO. of Little Rock, Ark., manufacturer of commercial airplanes, announces it is now preparing to put in production a type of plane suitable for freight and express carriers by air lines operating on regular schedules. This plane can also be furnished with a patented mechanical dropping device for the handling of certain commodities. The device was primarily designed for the delivery of newspapers, and several of the large European newspapers are now using this plane equipped with the dropping device in the daily delivery of their papers to distant towns.

The plane was designed by the Ernst Heinkel Airplane Works of Warnemuende, Germany, and is known in Europe as the Heinkel model H.D.40. It is through Albert Voellmecke, chief engineer for the Arkansas Aircraft Co., who until recently was associated with the Heinkel Works in Germany, that arrangements are being made to manufacture this plane in America.

The H.D.40 follows Heinkel practice in construction in that it has a large welded steel tubular fuselage with high lift wood wings. It is planned that these planes will be produced with Pratt & Whitney "Wasp" or "Hornet" engines or with Wright "Cyclone" engines. The plane was designed in compliance with the requirements of the German Technical Department for Aeronautics at Adlershof.

It is a highly staggered biplane with the rear spar of the upper wing directly above the front spar of the lower wing. By using an N type interplane strut the middle member is vertical. Only one set of lift and landing wires is employed. The upper and lower wings are built of two panels each. The lower wing has a slight dihedral while the upper wing has none. There is no sweep back. In the center of the upper wing there is a brass fuel tank that feeds to the engine by gravity. It carries sufficient fuel for five hours. The internal wing structure consists of box spars and plywood ribs with spruce cap strips. Between the spars, the under surface of the wing is covered with plywood to take the drag loads. To preserve the wing profile, which is a special Heinkel development, the leading edge is reinforced with plywood while the rest of the surface is fabric covered.

The pilot's cockpit is below the upper wing and behind a fireproof bulkhead at the rear of the engine compartment.



Front view of the Heinkel H.D.40 which will be manufactured in this country by the Arkansas Aircraft Co.

This cockpit is wide enough for two people so that either a passenger or mechanic may be carried. Access to the cockpit is through a door at the right side of the fuselage. Below the pilot's seat is a device for dropping mail, newspapers, etc. When the device is not installed, this compartment is used for freight in addition to the main freight compartment behind the cockpit. The main compartment is six feet high, three feet wide and ten feet long, while the compartment under the cockpit is four and one half feet high, three and one half feet wide, and four and one half feet long. At the rear of the large compartment is a door on each side of the fuselage.

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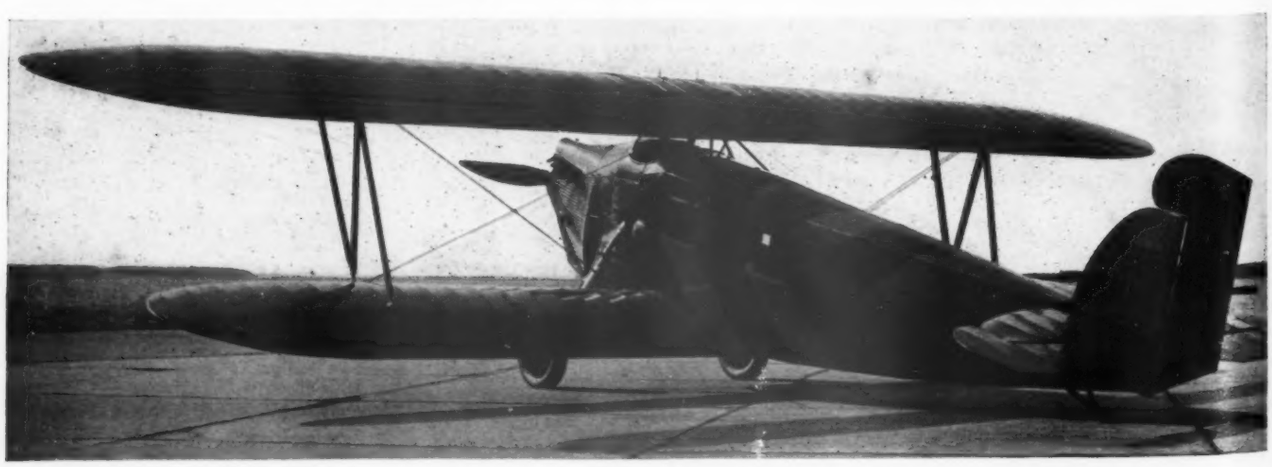


Rear quarter view of the Heinkel H.D.40 powered with a B.M.W. type 6 engine.

Portland's Island Airport

Construction Now Well Under Way on Oregon Location Which Will be Suitable for Both Seaplanes and Land Planes

By JOHN W. ANDERSON

All those who were present at the Washington Conference held last December will recall that considerable mention was made of the island airport at Portland, Ore. The following article describes in some detail the proposed layout of that much talked of location and perhaps substantiates the belief that it is worthy of a AAA rating regardless of the fact that in area it is not 2,500 ft. by 2,500 ft.—ED.

THE PORT of Portland, Ore., is constructing an island so that the City of Portland may have an airport. For many years Swan Island served only as an obstruction in the Portland ship channel. The channel made a dangerous curve to the north and east of the island, a low, marshy piece of ground for which nobody had any use.

The question of a municipal aviation field was brought to the attention of James H. Polhemus, general manager and chief engineer of the Port of Portland. He saw a chance to kill two birds with one stone. He showed the port commission that a straight, wide, deep channel could be dredged to the southwest of the island and that part of the dredging could be used in building up and enlarging Swan Island into an airport.

The suggestion won favor and for many months dredges have been pumping sand and silt onto what was once the insignificant Swan Island. Within a comparatively short time, Portland will have an airport 6,700 ft. long, 1,220 ft. wide connected to mainland by a 350-ft. causeway. Between the island and the mainland, in the path of the old channel, there will be a still water basin a mile long and 700 ft. wide, admirably suited for landing of seaplanes. This will make Portland one of the few municipal airports accessible by both land and water aircraft.

Mr. Polhemus points to a number of advantages held by the new airport:

It is only 10 or 15 min. away from the heart of the city.

It is on the Willamette River, the principal tributary of the Columbia River and not far from the confluence of the two. This makes it easy to locate.

Drainage of the Field is Good

It is directly on the natural Pacific coast airway and the east-west crossing of the Cascades by way of Columbia Gorge, the only easy crossing of that high range in the Northwest. Many times fliers, unable to cross over the range in southern Oregon or in Washington have swung to the upper Columbia River and followed it down between the mountain peaks to Portland whence they continued along the coast to their destinations. Even when it is foggy the peaks along the way offer excellent beacons directing the way through the gorge, which is really a broad deep valley cutting through a high range of mountains.

Drainage on the field is good and weather conditions are

Continued on page 720

Aerial photo showing the present state of construction of Portland Airport, Portland, Ore.

Ralph C. Lockwood Now Heads Fairchild Sales Engineering Dept.

ANNOUNCEMENT HAS been made that Ralph C. Lockwood has resigned as Supervising Inspector of the Department of Commerce, Aeronautics Branch, Washington, D. C., to become associated with the Fairchild Aviation Corp. According to Sherman M. Fairchild, president, Mr. Lockwood will head a new division, known as the Sales Engineering Department, the purpose of which is to give operators of airlines and individual prospective owners advice in connection with aircraft maintenance and operation.

Six months after the World War broke out, Lockwood joined the Royal Flying Corps in London, Eng., and served as a pilot with that organization until April 1919. In May of that year he returned to this country and organized the Service Aviation Corp. in Wabash, Ind., which operated under his direction until December 1920. At that time he was offered the position of civilian test pilot at the United States Army Experimental Station, McCook Field, Dayton, O. Here he was not only active in test flying, but became Assistant Chief of the Flying Section of the Engineering Division of that field. In December 1926, Lockwood resigned to join the Aeronautics Branch of the Department of Commerce. He organized methods of inspection and licensing of airplanes, pilots, and mechanics under the supervision of William P. MacCracken, Jr., assistant secretary of Commerce for aeronautics.

Great Growth Shown at Pioneer Instrument Co.'s Ninth Birthday

THE PIONEER Instrument Co., makers of the Earth Inductor Compass and other standard aeronautical instruments, celebrated its ninth year in business on March 1. On that day nine years ago, two young men rented bench space in a fourth floor loft on Washington St., New York City. They were Charles H. Colvin and the late Brice Goldsborough. While one worked at the bench, the other fared forth to "dig up" enough business to keep his partner busy. Uncle Sam was their first customer and his order called for the furnishing of Turn Indicators to the three NC flying boats which were at that time being prepared for the initial attempt to span the Atlantic.

Joined by M. M. Titterington in 1920

Thereafter the business progressed slowly but surely. In August 1919 Colvin and Goldsborough moved into a small shop on Greenwich St. to build gauges and other instruments. On Jan. 1, 1920, they were joined by Morris M. Titterington, who was later to receive world acclaim as the inventor of the Earth Induction Compass. The building on Greenwich St. was sold over their heads and on June 1, 1920, they moved to Brooklyn locating at 136 Havermeyer St. Here the company stayed until August 1923, when the present plant at 754 Lexington Ave. was purchased.

The first birthday of the Pioneer Instrument Co. in 1920. saw that organization with six men and a small shop. Today its operations have increased to such proportions that on its ninth birthday more than 20,000 sq. ft. of floor space is being utilized. Nearly 200 workers are employed and modern methods in plant management have kept the labor turnover to less than 1%.

A large staff of engineering research workers are daily utilizing every known agency in the development and perfection of Pioneer aeronautical instruments. Even the motion picture camera has been called upon as an aid in the problem solving.

Statistics show that the company manufactured more than 6,500 separate units in 1926. This figure was more than doubled in 1927. Twenty-six per cent. of the business done in 1927 consisted of shipments to 13 foreign countries. Sales agencies have been established in Paris, Tokio, Berlin, Milan, Madrid, and Amsterdam.

Among the Pioneer products to be exploited all over the world are the earth inductor compass, the flight indicator, and the aircraft hand pump. These instruments were used successively by the round-the-world fliers, by Col. Charles A. Lindbergh on his flight to Paris, by Commander Byrd in his dash by air over the North Pole and on his trans-Atlantic flight, by Chamberlin and Levine on their record non-stop flight to Germany, and by Brock and Schlee on their round-the-world flight.

Semi-Diesel Engine Constructed By Company in Glasgow, Scotland

WM. BEARDMORE & Co., Ltd., of Glasgow, Scotland, recently constructed a very interesting heavy oil engine of the semi-Diesel type. The Tornado Mark I was designed primarily for airship use and has developed a maximum of 720 hp. at 1100 r.p.m. though it is rated at 650 hp. at 1000 r.p.m. The engine weighs approximately 3,000 lb. or 4.16 lb. per hp. and has eight cylinders with a bore of 8½ in. and a stroke of 12 in. It is understood that the Tornado, which burns crude oil rather than gasoline, is to be installed in the R-101, the large airship now under construction in England.

Induction side of the Beardmore "Tornado Mark I" semi-Diesel engine.

Passenger Service Begins Between San Francisco and Seattle, Wash.

REGULAR PASSENGER service over the San Francisco-Seattle route recently began according to Charles V. Eakin, general manager of the West Coast Air Transit Co., operator of the new air line. This line is being backed by officials of the Pickwick Stages, the largest bus system in the West, and it is said that the fare will be exactly the same as that charged by the railroads, while express will be handled through the offices of the Pickwick Stages.

Although it is planned to later extend this service to Los Angeles, the cities served for the present will be San Francisco, Corning, Medford, Portland and Seattle, the flying time to be six and one-half hours.

Syracuse to Hold First New York State Aero Show April 30-May 5

THE FIRST New York State aircraft show has been scheduled to be held in Syracuse at the State Armory April 30 to May 5. It will be known as the New York State Aircraft Exposition. The show is being sponsored by Syracuse Chapter, N.A.A., and was given official approval of the New York State Aviation Committee at its recent meeting in Albany.

Gordon K. Hood, manager of the Municipal Airport and president of the local chapter of the N.A.A., was appointed chairman in charge of the exposition. He has named the following men to assist him: R. L. Kincaid, Robert J. Hogan, Jr., H. O. Nevin, Clarence J. Foertch, E. R. Vadeboncoeur, E. B. Hannam, and John S. Pendergast.

Airplane manufacturers throughout the country are being asked to exhibit their products in the show, many having already promised to have planes in the exposition hall. Engine and accessories manufacturers will also be invited. A show attendance for the week running into tens of thousands is expected.

The Exposition Committee will seek the approval of the Aeronautical Chamber of Commerce before plans for the show are completed. With this approval received, prominent figures in aviation throughout the country will be invited to attend.

Members of the Exposition Committee plan to attend the All-American Aircraft Show at Detroit April 14-21 in a body. Prospective Syracuse exhibitors will be interviewed, and the New York State Exposition will be modeled as closely as advisable after the Detroit show.

Booklet of Aircraft Tubing Data Is Issued by Summerill Company

SUMMERILL TUBING Co. of Bridgeport, Pa., has just issued a 20 page booklet entitled "Aircraft Tubing Data". It deals with the physical properties and chemical composition of the different tubing manufactured by the company, and also gives complete information about the sizes of their standard round, square, and streamline sections as well as the same information for a few special sections. Other matter and a price list is included.

Straight carbon, chrome molybdenum, and 3½ nickel steel tubing are the different grades of Summerill tubing. The chemical composition and physical properties are given for each steel. Dimensions of the standard and a few of the more commonly used special sections are shown with the aid of drawings. A table gives the weight per foot of cold drawn seamless steel tubing for sizes from 1/16 in. to 3½ in.

One unit of the Summerill factory is devoted exclusively to the manufacture of aircraft tubing. Warehouse stocks are kept of all standard sizes. The Summerill Tubing Co. also manufactures brass, copper, aluminum, nickel silver, and pure nickel tubing in 1¼ in. and smaller sizes.

Indian Lake Aviation Co. in Ohio Carries 30,000 Without Accident

MORE THAN 30,000 passengers carried in eight years without an accident is the record reported by the Indian Lake Aviation Co. of Russells Point, O., which operates an airport at the Indian Lake summer resort section in Ohio. The company's high passenger carrying mark was reached on July 4-5 last year when a total of 1400 persons were taken for hops.

Ryan Aeronautical Corp. to Open Flying School at San Diego May 1

IN CONJUNCTION with the Pacific Technical University, the Ryan Aeronautical Corp. will operate a modern and complete flying school beginning May 1 at San Diego, Calif. Until the completion of Lindbergh Field, the school will be conducted at the Ryan Flying Field on Barnett Ave. The company also announced that it will operate a plant which will embody all the modern facilities of the principal European airdromes. There will be a rest room for students, pilots, and passengers, a cafe, and a fleet of aerial taxis which may be chartered for air trips either over the city or to any part of the state.

The school will offer two courses of instruction. The regular 12 hr. flying course will be supplemented by a 30 day ground course at the Pacific Technical University, which will have its headquarters near the flying field.

Students taking the 12 hr. flying course will be required to spend four hours a day at the technical university. Upon the satisfactory completion of the course, the student will be granted a private pilot license by the Aeronautics Branch of the Department of Commerce.

The second course is confined to students who plan to make aviation a career. Those enrolling will be required to spend three months at the technical university to acquire a fundamental knowledge of aerodynamics. Their flying instruction in instruction planes will cover a period of 50 hr., and upon graduation and certification by those in charge of the flying school the Department of Commerce has agreed to issue them a commercial pilot's license, authorizing them to handle planes engaged in commercial business.

Under the agreement between the Ryan company and the federal authorities, no student will be permitted to enroll until he has passed the required physical examination and has obtained a student's license.

The latest types of planes, to be equipped with Ryan-Siemens engines, are to be used in the school and in the passenger service.

Postmaster General Calls for Bids On Three Additional Air Mail Lines

POSTMASTER GENERAL NEW recently announced that he would immediately call for bids for three additional air mail routes returnable within 60 days of the date of issuance of invitations.

The first of these routes will connect Chicago and Atlanta, via Terre Haute and Evansville, Ind., Nashville and Chattanooga, Tenn., with a spur from Evansville to St. Louis, giving the latter city a connection with Atlanta, and later with Florida and Cuba. This route will run on night schedule with planes leaving Chicago, southbound, and Atlanta, northbound, at 8:30 P.M. with a view to arriving at the terminus early the following morning. It will give Chicago a connection with the southeast and also with New Orleans by way of Atlanta, and vice versa.

The second route for which bids are to be asked will extend from St. Louis to Kansas City, Mo., including Texas to southwestern points and later with a projected line to Mexico City. The schedule, however, will not synchronize with the Evansville route.

The third proposed route will cover the State of Michigan, running from Chicago to Kalamazoo, Mich., via South Bend, Ind.; to Bay City via Lansing, Flint, and Saginaw, with spurs branching out from Kalamazoo to Pontiac, via Battle Creek, Jackson, Ann Arbor, and Detroit, and to Muskegon, via Grand Rapids.

Goodyear Company is Now Building Baby Dirigible of Improved Design

A NEW baby dirigible, "The Puritan", has been designed by Goodyear engineers and now under construction in the Akron, O., factories of the company. The air yacht, which is somewhat larger than the Goodyear airship "Pilgrim", will be sent on its first trial flight in May. It will have a wider cruising range, higher speeds, and greater lifting capacity than its predecessor "The Pilgrim", the first airship of the type to be built in America.

Powered with two radial air-cooled engines of recent design, mounted on outriggers to eliminate cabin noise and vibration, the new ship will have a cruising speed of 46 m.p.h. and a top speed of 55 m.p.h., while the range of operating with four passengers will be 350 mi. With two passengers and a pilot, the ship will be able to travel 550 mi. without refueling, engineers say.

"The Puritan" will be 128 ft. in length, 37 ft. in diameter, and will hold 86,000 cu. ft. of helium. Improvements in design include a wide, strong keel within the envelope attaching the cabin to the ship, a second rudder on the top side for additional maneuverability, dual controls for the training of student pilots, and the placement of engines outside the passenger compartment.

The first flights of "The Puritan" will be made from the Wingfoot Lake Air Station of Goodyear.

Congress Gets $475,000 Estimate For Additional Lighted Air Routes

THE PRESIDENT has sent to Congress a supplemental estimate of $475,000, which it is stated will be required by the Department of Commerce for aviation purposes during the fiscal year 1929. The purpose of this estimate is to provide lighted airways in excess of the 2,500 additional miles for which provision was made in the regular Budget for the fiscal year 1929 to meet the rapidly expanding postal contract requirement and to increase the radio facilities needed to safeguard transit over these lines. The Post Office Department has entered into contracts for carrying the mails by airplane over distances aggregating 11,440 mi. Delivery is now in operation over 7,610 mi. of the total contracted distance, while operation is not yet in effect over 3,830 mi.

There will be 10,000 lighted miles by June 30, 1929. Although the estimated lighted mileage on that date is 1,440 mi. less than the present number of postal contract miles, this is compensated for by reason of the fact that night flying over some of the mileage is not required under postal contracts. However it is believed provision in addition to that provided for in the regular Budget should be made to meet expanding needs in excess of those contemplated when the 1929 Budget was submitted.

Beacon System Now Nearly Ready On Los Angeles-Fresno Mail Route

CONTRACTORS ARE now completing the work of installing beacon lights between Los Angeles and Fresno on the Pacific Air Transport mail route, according to Francis J. O'Leary of the airways division of the Department of Commerce, who is supervising the installation of these lights.

These beacons are of 5,000,000 candlepower and are mounted on steel towers 51 ft. 6 in. in height placed at intervals of 10 mi. Two 1,000 watt bulbs are placed in each light, one in a vertical position and the other leaning slightly from the perpendicular, with a reflector 24 in. in diameter. From 30 min. before dark until 30 min. after dawn these lights will revolve once every 20 sec. On each beacon just below the lamp are two course lights, throwing their beams each way along the route. Under the tower and lighted with flood lights is a white arrow laid out in concrete 56 ft. long and 12 ft. wide, indicating the true course. Acetylene blinker lights of 2,500,000 candlepower placed between the regular beacons flash out the distance from either terminal in the Morse code in order that the pilot may know his exact location. Between Los Angeles and San Francisco there will be 37 of these beacon lights and a number of blinkers.

Ruth Nichols Takes Sales Position With Fairchild Airplane Mfg. Corp.

MISS RUTH NICHOLS, prominent in New York and Westchester County society and one of the foremost women pilots in the United States, has joined the sales organization of the Fairchild Airplane Mfg. Corp. of Farmingdale, L. I., N. Y. Miss Nichols last July received her transport pilot license and also has a F.A.I. certificate. She has flown extensively in this country and in Europe and recently piloted a Fairchild All-Purpose Cabin Monoplane from New York to Miami on the first non-stop flight between these cities. A flying demonstration by her at Le Bourget, Paris, three years ago was highly commended by the French.

Miss Nichols, probably the first woman to take up the actual selling of planes as a vocation, is well qualified for her work. Her flying experience extends over a period of five years. She does her own demonstrating and can talk airplanes as well as fly them.

In addition to her work of selling Fairchild planes, Miss Nichols will devote herself to the promotion of aviation in general. One of the first projects she will undertake along this line is the establishment of a flying country club to be located at the new Fairchild Aviation Center at Farmingdale. It is planned to make this club like any other country club except that flying and not golf will be the interest of the members.

Two Pennsylvanians Constructing Fully Equipped $200,000 Airport

LEE TEMPLETON, president of the Lee Motor Co., and John T. Keyser, secretary-treasurer, are completing the construction of buildings at an expenditure of $60,000 at their flying field on the Germantown Pike, six miles north of Norristown, Pa. Upon the completion of the airport their total investment is expected to reach $200,000.

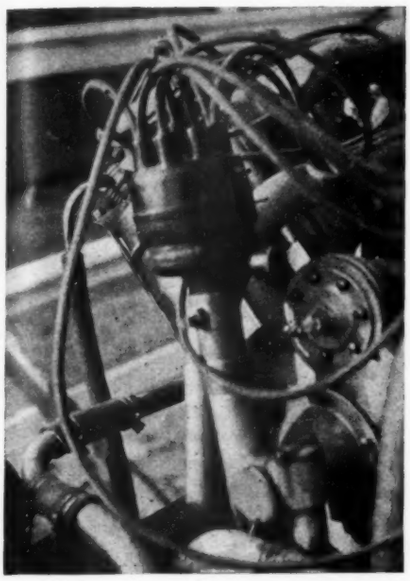
The buildings include a 60 by 128 ft. hangar capable of accommodating 12 to 15 planes, a 60 by 120 ft. machine shop, a 20 by 60 ft. engine testing room, and a 20 by 40 ft. laboratory. The field comprises 64 acres, with runways ranging from 1,800 to 2,000 ft.

The company is specializing at present on plans for a small radial, air-cooled aircraft engine, several models of which have already been turned out and sent to California and Mc-Cook Field for test purposes. Mr. Templeton and Mr. Keyser, both of whom live at Collegeville, Pa., expect to manufacture three and five cylinder engines, the three cylinder engines to be of 38 hp., and the five cylinder power plants 66 hp.

The engines have been designed on a basis of 2.97 lb. to 1 hp. The three cylinder plant is expected to sell for $[illegible] and the five cylinder for $800. When both are placed on a production basis the prices will be substantially reduced, it is said.

Delco Dual Ignition System May Now be Installed on OX5 Engine

WALTER A. HAMILTON, shop superintendent of the Aero Corp. of California and Wright engine expert, recently announced that he is now prepared to install his new Delco dual ignition system on any OX5 engine.



Showing the Delco unit installed on an OX5 engine.

The complete installation consists of one eight cylinder distributor head with dual breaker points, a special casting tachometer drive assembly, which drives the distributor head, eight additional spark plugs, allowing two per cylinder, one wind driven generator, one switch, one ammeter, one generator relay, one distributor head coil, and one small radio battery. This set is said to be proving popular because of its safety feature for flying over rough country.

Mr. Hamilton has perfected a number of improvements for OX5 engines and his shop, which is completely equipped with drill presses, lathes, and other machinery, is kept busy installing them on engines used in local race meets.

Varney Air Lines Will Distribute Stearman Planes Over Large Area

THE VARNEY Air Lines, according to the Seattle offices of that company, has signed a contract with the Stearman Aircraft Co. of Wichita, Kan., for the distribution of Stearman commercial aircraft throughout Washington, Oregon, Idaho, and Northern California as far south as Bakersfield. Contract for the distributorship was obtained by Frank P. Bell, general manager for Walter T. Varney, president of Varney Air Lines.

Operations of the distributorship will be conducted from the company's offices in Seattle and Spokane, Wash.; Boise, Idaho; and Oakland, Calif. As rapidly as possible dealerships will be awarded to responsible agencies.

Acceptance of the Stearman contract was authorized by Walter Varney only after practical tests of the plane had been made for a period of several months over his air mail route between Pasco, Wash., and Salt Lake City, Utah. Powered with a Wright Whirlwind engine, the test plane carried its share of the northwest air mail loads in all kinds of weather and at all altitudes up to 15,000 ft.

Amply financed, the Stearman factory has started production of 10 planes a month. As the demand increases the production will be raised. Standing orders have already been placed for the new Stearman mail plane by Varney Air Lines and Western Air Express, and it is expected that these craft will be made standard equipment for several new commercial airlines now being formed.

Stanley W. Jacques Joins Staff Of The Keystone Aircraft Corp.

ANNOUNCEMENT OF the appointment of Stanley W. Jacques as service representative in charge of advertising and commercial sales of the Keystone Aircraft Corp., Bristol, Pa., has been made by Edgar N. Gott, president of that company. Mr. Jacques brings to the Keystone firm a well rounded experience as war pilot, engineer, and sales executive.

In addition to his other duties with the Keystone Aircraft Corp., Mr. Jacques is to act as test pilot and is commissioned to cooperate with users of all planes after they leave the factory.

In 1917 Jacques left the Sheffield Scientific School of Yale University and served overseas as flight commander of the 3rd Pursuit Group, Lafayette Squadron. He received the Brevet Militaire and was recommended for promotion to captaincy. In 1919 he returned to Yale and received his Ph. D. degree.

Following his graduation he held a number of important business positions. Then in 1926 he took a graduate course at the University of Wisconsin, receiving the degree of M. S. in metallurgy. For years Jacques has kept up his interest in aeronautical matters through active training as a reserve pilot. He holds the reserve commission as captain in the Army Air Corps.

Recently Formed Keystone Flying Corp. is Dealer for American Eagle

THE KEYSTONE Flying Corp. was recently formed in Philadelphia, Pa., with offices and a flying field at Roosevelt Boulevard and Red Line Road. The company is a dealer for American Eagle planes and has purchased three OX-5 biplanes which are now being delivered. It has 155 acres inside of the city limits, for the flying field, which will be operated for day and night flying. One B.B.T. floodlight has already been purchased, and a steel hangar 50 by 80 ft. is under construction.

A flying school is being organized, with Lieut. Milton K. Erdman of the 27th Aero Division of the Maryland National Guard and Joseph Olp, former Navy lieutenant, as permanent instructors and pilots. George R. Hutchinson is the managing director of the corporation.

Four More Airplanes are Approved By The Department of Commerce

FOUR MORE airplane types have been approved of late, according to a Department of Commerce bulletin. They are: 22. Central States Aero Co., Monocoupe (60 Anzani or Siemens engine) two place open biplane; 24. Stinson-Detroiter SB-1 (200 Wright) four place cabin biplane; 25. Mahoney, Ryan B1 (Wright J5); and 26. Advance Aircraft Co., Waco 10 (Siemens 90 to 125 hp. engine). The first 21 approved types were listed in the Feb. 13 issue of AVIATION.

Russell F. Hardy Takes Position With The Advance Aircraft Co.

RUSSELL F. HARDY, according to a recent announcement, has accepted a position as assistant to the chief engineer of the Advance Aircraft Co. of Troy, O. His address is now 501 S. Mulberry St. in that city.

B. R. J. Hassell Plans a 4,283 Mi. Flight from Chicago to Stockholm

TO DEMONSTRATE the feasibility of airplane flights over the Arctic to Europe, a 4,283 mi. flight from Chicago, Ill., to Stockholm, Sweden, will be attempted this summer by Pilot B. R. J. Hassell of Rockford, Ill., formerly a member of the Army Air Service. Hassell will attempt the flight in a Stinson monoplane similar in design to the Brock and Schlee plane "Pride of Detroit" used on the round-the-world attempt last spring. He will be accompanied by one navigator whom he will name in the near future.

Pilot Hassell visited Ann Arbor, Mich., recently to confer with Prof. William Herbert Hobbs, director of the University of Michigan's weather observatory atop Mt. Evans in Greenland. According to present plans the course of the flight to Stockholm is to follow the great circle route from Chicago over Greenland, Iceland, and down the coast of Norway. One stop will be made. This will be at a point within two miles of Mt. Evans on a sand flat at the head of the Sondre Stroemfjord.

The purpose of the flight, according to Hassell, is to demonstrate the practicability of arctic airplane routes to Europe. Professor Hobbs will go to Greenland in May and will send andvance weather forecasts to Chicago before the start of the flight next June.

Outside Loops Grow in Number As West Coast Flier Turns Six

ACCOMPLISHING ONE of the most difficult stunts in aviation, Lieut. Daniel W. Tomlinson, aircraft squadrons, battle fleet, at San Diego, Calif., recently maneuvered six outside loops in a Wasp engined Boeing fighter. This is the third time the feat has been accomplished. Lieut. James Doolittle for the Army, Lieut. Al. Williams for the Navy, and Tomlinson are believed to be the only fliers who ever performed the stunt. Flying an F2B Boeing fighter, Lieutenant Tomlinson made three upward and three downward outside loops.

He began his maneuvers over North Island at the 3500 ft. level. The upward loop started with a half roll at the bottom, placing the top of the plane on the outside of a gigantic circle, but requiring another half roll to come out of the loop right side up when the loop was completed. The downward loops, starting after the plane had been practically at the top of a slight climb, were exactly like a forward somersault, or a "forward one-and-a-half" dive. Both the plane and the Wasp engine were examined after the loops and found to be in excellent condition.

Following Lieut. Al. Williams' recent outside loops, Rear Adm. William A. Moffett issued an order forbidding naval aviators attempting them. The orders reached fighting squadron 6, Lieutenant Tomlinson's group, the day after his successful maneuvering of six such loops.

Milwaukee Company Manufacturing Portable Airport Tank Equipment

THE HEIL Co. of Milwaukee, Wis., is manufacturing tank equipment to be mounted on an automobile truck for use at an airport for the refueling of airplanes. The equipment, which is mounted on a two-ton Graham truck, consists of a four compartment electrically welded steel tank. The two forward compartments have capacities of 150 and 100 gal. respectively and are used to carry gasoline while the rear compartments of 25 gal. each are reserved for lubricating oils. The gasoline is hosed from the truck tank to the airplane tank by a Heil rotary pump unit that is operated by the truck motor through the use of a power take off. The hose and piping are 1½ in. diameter and the gasoline outlet and filler are both fitted with 100 mesh screen. The lubricating oil is discharged into buckets and then poured into the airplane oil tank. A Heil tank is in use at the Buffalo, N. Y. airport and it is stated that this unit pumps gasoline at the rate of 100 gal. in five minutes.

Art Goebel and Ernest Robinson To Tour Orient in Fairchild Plane

COL. ARTHUR C. Goebel, winner of the Dole Race to Honolulu, left Curtiss Field, L. I., N. Y., recently in a Fairchild cabin monoplane to fly across the continent to San Francisco there to place his plane aboard the *Korea Maru*, sail to the Orient, and there make an extended tour. Goebel is accompanied by Ernest Robinson, vice president of the Fairchild company. Robinson will be a passenger.

The itinerary of the cross-continent flight is: Washington, D. C.; Dayton, O.; St. Louis, Mo.; Bartlesville, Okla.; El Paso, Tex.; Los Angeles, Calif.; and San Francisco. The Fairchild plane was to be placed on board the *Korea Maru* on Mar. 15, while the ship is to dock at Tokio Mar. 30.

This is the first attempt of an American aviation company to enter the Eastern field. Letters of inquiry from China and Japan have been favorable, according to Sherman Fairchild, president of the Fairchild Aviation Co.

The company also plans to send planes to Europe at a later date, it is understood. The small cabin monoplane of the Fairchild type is an American development little known in Europe.

Rhone Engines to be Rebuilt by Quick Motor Co. of Wichita, Kan.

THE QUICK Motor Co. was recently formed in Wichita, Kan., for the purpose of converting and marketing Rhone engines. These engines which were formerly of the rotary type are being converted into static radial engines. For the past few weeks the organization has been tooling up and installing special machinery necessary for this conversion, and expects very shortly to be turning out the new engines on a production basis. It is understood that the company is installing complete electrical equipment and that each engine will be given a dynamometer test showing the actual power developed, gasoline and oil consumption.

H. H. Patton and associates of Wichita organized the Quick Motor Co. and have purchased a considerable number of Rhone engines.

N.A.A. Refuses to Approve Race From New York City to Bermuda

APPROVAL OF the proposed seaplane race between New York and Bermuda has recently been refused by the National Aeronautic Association because of a lack of proper navigational facilities. No sanction would be given by the Association unless a radio beacon be first installed at Bermuda to aid pilots in locating the island, or the start of the race be Bermuda rather than New York. The backers, it is understood, have as yet failed to comply with these suggestions.

The race was sponsored by the Bermuda Trade Development Corp. Prizes were to total $10,000.

Smithsonian Institution Secretary Makes an Offer to Orville Wright

THE FOLLOWING is the offering of Secretary C. G. Abbot of the Smithsonian Institution to Orville Wright regarding the placing of the Wright plane in the Institution.

Elected in January to be Secretary of the Smithsonian Institution, I inherited a knotty problem, for February brought me face to face with the Wright controversy. On February 13 I wrote to Mr. Orville Wright: "It would be a matter of great gratification to me and to all our countrymen if now, or even at a later time, you should see your way to depositing it (the Kitty Hawk machine) here."

On his part Mr. Wright has said that both he and his late brother wished to deposit the plane in the United States National Museum, but that it is now sent "to the British National Museum because of the hostile and unfair attitude shown towards us by the officials of the Smithsonian Institution." It is stated that the plane is still subject to recall. Since both Mr. Wright and the Smithsonian desire it, there remains only to come to just terms.

The people of the United States, who support the National Museum, are vitally interested. They ardently desire that an object of such pride to all Americans as the Wright machine of 1903 should join the National Valhalla of aeronautics where rest so many planes that have made aviation history.

I will not again present from the other point of view the questions recently raised by Mr. Orville Wright and his friends, for fixed opinions would remain unchanged. Braving warnings that whatever I now say will be misconstrued, I ask a fair hearing for the following offer.

To make understood what I now propose, I must explain that the Langley machine of 1903 is now on exhibition in the National Museum, with a label attached which was prepared in 1925, according to the advice of a committee. Two gentlemen from outside the Smithsonian, namely, Dr. Joseph S. Ames, of Johns Hopkins University, Baltimore, and Admiral David W. Taylor, United States Navy, who are now Chairman and Vice-Chairman respectively, of the U. S. National Advisory Committee for Aeronautics (of which body Mr. Orville Wright is also a member), formed the committee. At the late Secretary Walcott's request they examined the records of the Langley machine, including much unpublished correspondence, took testimony of experts, and presented a report which was given to the press on June 9, 1925. The label as revised to accord therewith now stands as follows:

LANGLEY AERODROME

THE ORIGINAL LANGLEY FLYING MACHINE OF 1903, RESTORED

IN THE OPINION OF MANY COMPETENT TO JUDGE, THIS WAS THE FIRST HEAVIER-THAN-AIR CRAFT IN THE HISTORY OF THE WORLD CAPABLE OF SUSTAINED FREE FLIGHT UNDER ITS OWN POWER, CARRYING A MAN.

THIS AIRCRAFT SLIGHTLY ANTEDATED THE MACHINE DESIGNED AND BUILT BY WILBUR AND ORVILLE WRIGHT, WHICH, ON DECEMBER 17, 1903, WAS THE FIRST IN THE HISTORY OF THE WORLD TO ACCOMPLISH SUSTAINED FREE FLIGHT UNDER ITS OWN POWER, CARRYING A MAN.

(There follows in small type accounts of the investigations of Langley and of his machines, too long to quote here.)

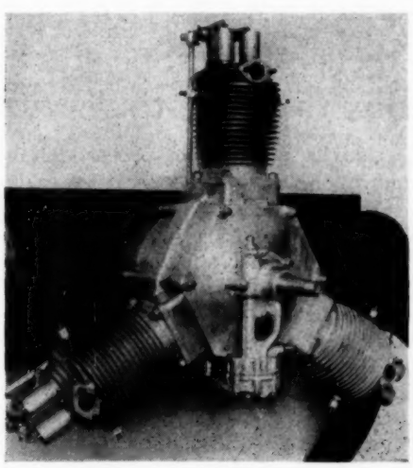
I believe that label to be just, as do my colleagues, and cannot think anybody would wish us to recant falsely. For the sake of the public, I make the following offer.

If Mr. Wright will openly state in a friendly way that he appreciates that the Smithsonian Institution honestly believes that the Langley machine of 1903 was capable of sustained free flight under its own power, carrying a man, and that it now removes that public statement, not in confession of error, but in a gesture of good will for the honor of America; then I am willing to let Langley's fame stand on its merits and to reduce the Langley label to this simple statement: "Langley Aerodrome—The Original Langley Flying Machine of 1903, Restored."

I will do this, of course, provided Mr. Wright will deposit the Kitty Hawk machine in the National Museum, where it has always been wanted, where it will have the place of honor due it, where the label will state that it was the first heavier-than-air craft in the history of the world to accomplish sustained free flight under its own power, carrying a man, and where it will be preserved inviolate to the Wright's perpetual honor.

Szekely Three Cylinder Engine Is to be in Production Shortly

THE SZEKELY three cylinder air-cooled engine, being developed by the O. E. Szekely Corp. of Holland, Mich., is reported to be giving very satisfactory results and will be in production very shortly. One of these engines was recently installed in a Driggs Dart II fuselage and gave very satisfactory results running with little or no vibration and excellent cooling. The engine is being changed slightly and it is expected to exceed the original expectations of developing 40 hp. at 1800 r.p.m. Over 100 hr. of tests have already been run on the dynamometer with the three cylinder model. It is understood that within the next few weeks a number of these engines will be delivered to the Driggs Aircraft Corp.



Front quarter view of the Szekely three cylinder air-cooled engine.

Two engines are being developed by the O. E. Szekely Corp., the other being a five cylinder radial air-cooled model developing about 65 hp. The engines are of very clean design having all push rods and accessories in the rear. They have a bore of 4 1/8 in. by 4 3/4 in. with a compression ratio of 4.8 to 1. Production on the five cylinder model will begin after the first deliveries on the three cylinder engines have been made.

Aerial Survey of Toledo Planned By Industrial Officials of Toledo

AN AERIAL survey of Toledo is now being planned, according to officials representing various industries in the Ohio city. A price of $10,000 for the mapping of an area not to exceed 115 sq. mi. has been made, it is stated by the Aerial Surveys Co. of Cleveland, O.

Relative to the survey, a meeting has been arranged between a representative of the Cleveland company and the county commissioners. Railroads, power companies, and various city and county officials are being approached in the interests of the plan.

Altitude Race for Loening Prizes Scheduled for College Aero Clubs

COLLEGE AIRPLANE pilots will engage in an altitude race at Mitchel Field, L. I., N. Y., on June 23. The competition will be on a team basis—the first group to reach the mile high level winning the contest and $5,000 in prizes being donated by Grover C. Loening, head of the Loening Aeronautical Engineering Corp. of New York City.

There are about 20 college aero clubs which fly small planes. The race this year will be confined to planes powered with Curtiss OX engines. The pilots may fly their own planes or borrowed ones, and the racing teams will be made up of three men from each college, each of whom will fly one heat in the same plane. The team which wins the highest number of points will be the winner. The planes will be equalized as much as possible by proportionate loading so that a plane with a larger wing area will carry a heavier weight than a smaller plane.

The race will be conducted under the auspices of the N.A.A. The details of the contest will be arranged at a meeting attended by the various college flying groups to be held in New York on April 9.

Cincinnati Erects a Loud Speaker Air Mail Box to Promote Service

CINCINNATI HAS a talking air mail box for standing on the corner of Walnut St. and Government Sq., a red, white, and blue air mail box has been equipped, to disseminate air mail propaganda. The mechanism of the box consists of an ordinary loud speaker and a broadcasting device, both of which were supplied by the Crosley Radio Corp. of Cincinnati, as an evidence of that firm's interest in air mail. The Embry-Riddle Co., operators of the Cincinnati Indianapolis-Chicago air mail route handle the broadcasting.

General air mail information, pleasantries, and sometimes personal appeals come from the box. The announcer is concealed from the listeners but can see them through a mirror. Every afternoon when the air mail plane leaves Lunken Airport, three airline miles away, the announcer is informed by telephone and in about two minutes, he has the crowd watching the skies to see the orange and silver plane pass. This is the real "kick" of the day.

Other announcements include descriptions of overnight service by air mail from Cincinnati and general time-saving service for the mail users of the city.

Two New Eaglerock Distributors Named by Alexander Aircraft Co.

THE ALEXANDER AIRCRAFT CO. of Denver, Colo., has announced the appointment of two new distributors of the Eaglerock plane. They are Roy B. Dodson, Kirksville, Mo., who has taken Southern Iowa territory, and Owen Meals of Valdez, Alaska, who is to operate the Meals Eaglerock Sales Co. in Alaska.

Robbing Flying Service Appointed Northeast Ohio Waco Distributor

THE ROBBING Flying Service, Akron Airport, Inc., Akron, O., is now distributor in Northeast Ohio for the Waco plane, according to a recent report.

Coffman-Strong Aircraft Co. in Oklahoma Now Producing Planes

FOR SOME months at the Clinton, Okla., airport, Sam Coffman has been busy on the construction of planes and three which he has built have already taken the air.

The Coffman-Strong Aircraft Co. was organized with C. R. Strong as Coffman's partner. The plans for the coming work of the company are now being made.

Meanwhile the first experimental model is nearing completion. The fuselage of the plane was built first. It is of steel tubes with space sufficient to accommodate a pilot, two passengers and luggage. The wings are made of spruce and white fir.

Laboratory tests of the plane have already been made. It is to be a closed cabin plane with gasoline tanks in the wings. A wide wheelbase with shock absorbers designed by Coffman, and good visibility in all directions are some other features of the new craft.

High Production Planned at New North Hollywood Airplane Factory

WORK HAS been started at North Hollywood, Los Angeles county, on what is understood to be a modern aircraft factory capable of at first producing a dozen planes per month with a later increase in capacity to the production of a plane a day. The company is to be known as the Victory Airplane Engineering Corp. and plans to produce commercial three place biplanes powered with the OX5 engine.

Forest W. Hicks of North Hollywood, is president of the new organization, William A. Shaffer, aeronautical engineer and wartime flier is general manager, Russell R. Benton is secretary, and Stanley Collins, treasurer. Twelve planes are said to be contracted for already at an initial price of $2800 each.

New Castle, Pa., Service Recently Formed Will Use Eaglerock Planes

INTEREST IN aeronautics of a group of New Castle, Pa., business men recently resulted in the formation of the Kegarise Air Transport, Inc., under the direction of Ralph R. Kegarise, World War flier. A tract of land lying three miles north of New Castle and of some 40 acres in extent has been put in condition by the company; and an airport with hangars, gas tanks, and accessories is now under way to care for two Eaglerock planes which Kegarise will put in service early in April.

Air transport and passenger service will be available at the field with the arrival of the Eaglerocks. Though the airport is only 40 acres in extent now, it may be increased to cover 90 acres in case traffic necessitates such a change.

National Iron Works Building Huge Hangar for the San Antonio Airport

THE NATIONAL Iron Works of San Diego is now fabricating a huge steel hangar which is to be erected at the Ryan Flying Field in that city and which later will be moved to the municipal airport. This hangar will have a floor space of 5000 sq. ft. and will house the fleet of planes which are to be used in the company's aerial taxi service and instruction work.

Commercial Manufacturers Organize As Aero Chamber of Commerce Unit

ORGANIZATION OF a permanent committee of commercial aircraft manufacturers as a unit of the Aeronautical Chamber of Commerce of America was effected at a meeting in Wichita, Kan., on March 5. Representatives of aircraft manufacturing companies throughout the United States were in attendance, electing J. Don Alexander, of Colorado Springs, Colo., chairman of the permanent committee with the following committeemen:

Thomas Hamilton, of Milwaukee, Wis., manufacturer of the Hamilton all-metal plane and Hamilton propeller; A. J. Edwards of the Prudden Company, San Diego, Calif.; Richard DePew, of the Fairchild Company, and C. J. Bruckner of the Waco organization. Mr. DePew was elected vice-chairman. The governing body will serve until the next meeting of officers and directors of the N.A.C.C. in December, when the manufacturers' group will also convene.

Lieut. Jack Harding, one of the four Army aerial circumnavigators, assisted in the formation of the unit, representing the National Association.

"The increase in all phases of aviation, particularly in the manufacturing end, make it imperative that some cooperative organization be created," he told the manufacturers. "Thirty or more companies have announced substantial production programs for 1928. By getting together and comparing experiences, you manufacturers can eliminate many bad features of present methods of production and sales and unscientific management. This organization will improve your mutual relations and those with the Government and the public."

In promising the support of the N.A.C.C. Lieutenant Harding, who will continue as secretary of the manufacturing group, advised the makers of airplanes to tackle their own peculiar problems first.

"Our biggest problem is the nationalizing of our business," Mr. Alexander told his fellow-manufacturers. "We must realize that our greatest competition is with other means of transportation and with luxuries. We must compete with all other lines of industry and business for the public's money. Beside that our competition with each other is relatively small.

"For the next two years there will be business enough for all of us. We probably won't be able to satisfy the demand for planes in that period. We should all work together for the further development of the aircraft market."

Standardization of dealers' contracts was advocated by Mr. DePew, to "prevent quasi-dealers from shopping around among manufacturers, and by playing one against the other, obtaining extraordinary concessions in commissions, terms, or territory." The governing body was authorized to prepare a uniform contract.

Dudley Steele, a representative of the California Air Race Association, told of plans for the International Air Derby to be staged in Los Angeles on September 3-9. There seemed to be a general feeling among the manufacturers present that in the awarding of the prizes too much emphasis had been put on speed and not enough on performance.

Chamber By-Laws Adopted

The by-laws of the Aeronautical Chamber of Commerce were adopted in so far as they applied to the needs of the Committee. The meeting of the Airway Marking Conference to be held in Wichita on May 10 and 11 was approved. Considerable time was spent in discussing the relation with the Department of Commerce. It was felt that the commercial manufacturers should present a united front in their dealings with the Department and it was agreed that the Department should be notified that the commercial manufacturers now had an organization. The "handbook" was discussed and it was suggested that mimeograph copies be sent out to manufacturers for study and that the final adoption should be delayed six months and that the rules should not be retroactive. It was decided to study further the question of the testing of airplanes for performance by the Universities giving aeronautical courses and if possible to lay down some standard forms of performance tests. The question of false advertising and misleading statements was discussed but no conclusions were reached.

Flying schools were discussed and it was suggested that some sort of legislation might be adopted by Congress which would help schools which gave their students a sufficiently complete course to make them valuable as military pilots. It was decided to draw up standards by which schools which met certain requirements could be given a 'Grade A' classification.

The matter of freight rates and classifications was discussed and the activities of the Aeronautical Chamber of Commerce in securing more equitable treatment were endorsed.

A group of the delegates that attended the commercial airplane manufacturers' conference held at Wichita, Kan. on Mar. 5.

French Fliers Complete Four-Stop New York-San Francisco Journey

CAPT. DIEUDONNE COSTES and Lieut. Comdr. Joseph Lebrix completed their cross-continent flight from Mitchel Field, L. I., N. Y., to Mills Field, San Francisco, when they landed their Hispano-Suiza Breguet biplane, Nungessor-Coli, on the latter airport on Mar. 7. They now plan to sail for Japan, there to continue around the world to France. The Nungesser-Coli, it is understood, will be used by the fliers to complete their journey after the Orient is reached.

Costes and Lebrix, arriving in New York following a four continent flight of 23,000 mi. from Paris to Africa, across the South Atlantic to South America, and thence north through Central America to the United States, rested for a few weeks in New York while awaiting the arrival of a new Hispano-Suiza engine from France. With the new power plant installed, the French fliers took off from Mitchel Field, L. I., on March 2 to fly to San Francisco. They were forced down by snow storms near Sharon, Pa., however, and could not continue the trip to Detroit, their first scheduled stop, until Mar. 4. On the latter day, better conditions prevailed, and the Frenchmen flew to the Michigan city with little trouble.

From Detroit, Costes and Lebrix flew to Chicago on Mar. 5. The following day they continued in a non-stop hop to Rock Springs, Wyo. On Mar. 7, they completed the cross-country journey when they landed at Mills Field, San Francisco.

New Type of Thomas-Morse Wings Being Built at Los Angeles School

THE WARREN School of Aeronautics reports that an experimental set of wings designed to improve the performance of the Thomas-Morse Scout has been under construction at the school.

The new wings are of conventional structure with truss ribs and box spars of plywood and spruce and were designed by R. F. Hardin, director of instruction, for a Thomas-Morse plane belonging to Lieutenant Rhine of Los Angeles. The wings are of tapered construction with the Gottingen 436 airfoil such as is used in the Boeing PW-9, are of semi-high lift, and it is thought will give about 10 m.p.h. greater high speed with the same or lower landing speed.

The top wing has a span of 26 ft. 6 in. with a chord of 66 in. at the center and 54 in. at the tip. The span of the bottom wing is 22 ft., and chord is 66 in. at center and 48 in. at tip. All parts of the plane will be standard Thomas-Morse with the exception of the new wings which are expected to give the plane an improved balance.

If this new wing design proves successful the Warren School of Aeronautics plans to go into production of them with a view to converting many of the obsolete Thomas-Morse planes into more modern sport planes of satisfactory performance.

To Open Ground School for Unit Of Massachusetts National Guard

A UNIQUE experiment in Massachusetts National Guard history will be made soon when the members of Company A of the 104th Infantry at Springfield will be given the opportunity to attend a ground school fostered by Capt. Louis Hasbrouck, commander of the unit. The purpose of the school, it is said, is to provide facilities for ground study at practically no cost to the students.

Classes will be held on alternating drill nights when the drill will be cut short and the balance of the time devoted to lectures and instruction on various elements of aeronautics. The project has already received the approval of Adj. Gen. Jesse L. Stevens at the state house and Col. Edmund D. Slate, commander of the regiment.

Assistance in lectures and demonstration of flying equipment is expected to be derived from Air Corps officers stationed at Boston and from the 101st Observation Squadron, Massachusetts National Guard.

Grays Harbor Airway Co. Formed In West to Produce Monoplanes

THE GRAYS Harbor Airway Co. has just been formed in Aberdeen, Wash., to manufacture a three passenger metal and spruce monoplane. The company has been incorporated for $300,000 and is headed by Carl Morck, local hotel owner. The board of trustees is composed of Frank Burrows, T. J. Grant, W. J. Dinsmore, Dewey Wilson, W. C. Daniels, and John T. Eagan. Five experimental planes will be built as soon as the plant is ready.

The organization is the outgrowth of a movement started last year among members of the Aberdeen Active Club for the construction of an airplane factory in this district and the development of greater interest in aviation. Immediate construction of a 50 by 50 ft. frame building with 12 ft. clearance, directly across the road on the port dock from the veneer plant and adjacent to the flying field, was ordered by the board.

Seattle Airways and Seattle Flying Service Organized for Instruction

TWO NEW schools of flying organized in Seattle are the Seattle Airways, Inc., and Seattle Flying Service, Inc. Z. F. Ballantyne is manager of Seattle Airways, Inc., and Charles E. Moore and W. F. McGill, associates. Hugh Hill, with 12 yr. experience, is chief pilot, The club system of instruction is to be used by the new company, enabling students to get limited commercial pilot's licenses as required by the Department of Commerce. Seattle Airways, Inc., is Washington state distributor for the Lincoln-Page plane.

Seattle Flying Service, Inc., has two Travel Air planes, one of which made a spectacular landing in the University of Washington stadium for the opening of the recent Automobile Show and Transportation Pageant. The pilots for the school are Lieut. H. V. Laughlin of the Army Reserve Corps of Vancouver Barracks, and Clayton L. Scott, formerly with Pacific Air Transport.

Boeing Airplane Co. Now Building Three 12 Passenger Air Liners

CONSTRUCTION OF three 12 passenger tri-engined air liners by the Boeing Airplane Co. of Seattle has been announced by P. G. Johnson, president. It is expected that these planes will be in operation, making week-end trips between Seattle, San Francisco, and Chicago by June 1. As service requires, they will make mid-week or daily journeys.

The new planes will fly on a 21 hr. schedule similar to that of the Boeing air mail and passenger planes at present. They provide space for 12 passengers and two pilots, with dual controls. They are equipped with three Pratt & Whitney Wasps. Their speed at sea level is to be 128 m.p.h. and their cruising range six hours.

Last Minute Briefs

As AVIATION goes to press Capt. Walter G. R. Hinchliffe, former R.A.F. officer, is out over the North Atlantic in his Stinson monoplane "Endeavor" en route non-stop from Cranwell Airdrome, England, to the United States. It is believed that the Hon. Elsie Mackay, third daughter of Viscount Inchape, is a passenger aboard the Endeavor but official confirmation has not been obtained as yet. Captain Hinchliffe took off from Cranwell at 8:45 A.M. (London time) March 13 and the last report of the plane having been sighted was received late that afternoon when a liner 170 mi. off the Irish coast reported the plane overhead and flying in a westerly direction.

Kenneth R. Unger, former R.A.F. officer and air mail pilot, has announced the formation of Unger Aircraft, Inc., located at 61 Madison Ave., Madison, N. J. The new company will act as distributor for Travel Air planes in New Jersey and south eastern New York. The company also plans to open five flying fields in the state of New Jersey. A car load of Travel Air planes is now en route to Madison.

The Curtiss Aeroplane and Motor Co., Garden City, Long Island, N. Y., is now designating its engines by names. Its two newest production models are to be known as the Conquerer V-1570 and the Conquerer GV-1570. The engines are of the 12 cylinder water cooled Vee type developing 600 hp.

President Coolidge has signed the bill granting authority to the Postmaster General to enter into contracts for the transportation of Mails by air to foreign countries and insular possessions of the United States for periods of not more than 10 years, and to pay for such service from the appropriation for the transportation of foreign mails at fixed rates per pound or per mile, and for other purposes. The bill will be printed in full in the next issue.

Lyndon M. Brown, vice president of Charles Prohinsie, Inc., Waco distributor at Curtiss Field, Long Island, N. Y., announces that he has purchased entire control of the company and that two car loads of Waco planes are en route to Curtiss Field. The new company will retain the old name for the time being.

The Auto Electric and Radio Equipment Co., Fort Wayne, Ind., has announced that it will sell aircraft and supplies. In addition a flying service and school will be conducted under the charge of Lieut. Clarence Cornish, reserve officer, U. S. Air Service.

The first of 24 planes on the Boeing transcontinental route was recently equipped with a Pratt & Whitney "Hornet" 525 hp. engine, replacing the 425 hp. "Wasp" engine. This change will be made on 12 of the 24 planes now in operation.

The first "Command-Aire" biplane of regular production was completed at the factory of the Arkansas Aircraft Co., Little Rock, Ark., on March 17. A production of two to three planes a week is planned according to officials.

A light plane built for testing a full sized airplane parachute was recently completed at the Crawford Airplane Co. factory at East Long Beach, Calif.

The Aeronautics Division of the Society of Automotive Engineers is to hold a two day session during the Detroit Aircraft Show, April 17 and 18.

The Curtiss Aeroplane and Motor Co. is building at its Garden City, N. Y., plant three Falcon biplanes for commercial use. These planes will be very similar to the military observation planes except that they will be powered with Curtiss V-1570 600 hp. engines and will carry two passengers in a closed cockpit in front of the pilot.

The Halpin Development Co. of Cincinnati, O., has under construction an all-metal closed cabin monoplane to be powered with a Pratt & Whitney Wasp engine. The "Flamingo" is a high wing semi-cantilever monoplane of all metal construction using duralumin sheeting for the covering. It is designed to carry five passengers and pilot.

Gray Harbor Airways of Aberdeen, Wash., has purchased the designs and equipment of the Santa Ana Monoplane Co. of Los Angeles, Calif. It is planning quantity production on a three place closed cabin model to be known as the Activian.

Frank Drew has been appointed manager of the Aviation Department of the Texas Pacific Coal & Oil Co., Fort Worth, Tex., to develop the sale of AMLO special airplane engine lubricating oils.

It is expected that the large transport monoplane under construction at the Hasbrouck Heights, N. J., plant of the Atlantic Aircraft Corp. for the Western Air Express, will be completed by March 23. This plane, which is powered with three Pratt & Whitney Wasp engines, is to carry 12 or 14 passengers and 1000 lb. of mail or express.

Two Scintilla A G-12-D magnetos are used on the Breguet XIX airplane which Costes and Lebrix flew from Paris to New York via Africa, South and Central America. These magnetos are of exactly the same type as those used on the Curtiss D12 and the Packard engines.

An organization to handle Simplex airplane sales in the East is being incorporated under the name of Simplex Aircraft Sales Corp. of N. Y. whose temporary office is at 25 West 76th St., N. Y. C. A number of dealerships have been signed up in the Metropolitan area with several still available.

Tests were recently made at Curtiss Field of the Curtiss Fledgling, a two bay Whirlwind biplane for the Navy. This plane won the training plane design competition held last year.

J. H. Carter of Chicago, Ill., is developing a radial, sleeve valve, aircraft engine. It is understood that the valves rotate in a manner unlike any other sleeve valve engine.

The Lark Aircraft Corp., recently formed in Wichita, Kan., has under construction a five place cabin monoplane which is expected to be in the air by the end of this month.

Becker Flying Service, Inc., has been appointed western New York state distributor for Alexander Eaglerock planes.

R. J. Wall and John Cochrane of the Toledo Transfer Co., Toledo, O., recently organized the American Air Transport, Inc., which will engage in commercial flying at that city.

Park Air Lines of St. Louis, Mo., has been named Travel Air agent for Missouri, Indiana, Kentucky, and more than half of Illinois.

Due to insufficient time in which to make final corrections on the Commercial Engine Specification Table which was to appear on this page it has been decided to print it in next week's issue of AVIATION.

Portland's Island Airport

Continued from page 709

suitable for easy maintenance of turf. As fast as the fill is completed it is covered with a foot or two of surface soil and planted with creeping bent, Kentucky bluegrass and a quick-growing cover of rye grass.

The completed airport will be long and narrow but prevailing winds parallel the island and insure easy landings. The nearest hills are low and three miles away. There are no artificial obstructions. The air over the field is not bumpy, and, since the landing is over water, the fog ceiling is always high enough to give pilots a chance to see.

Twice in recent weeks pilots have landed on Swan Island when it was impossible to get down anywhere else. Tex Rankin, head of the Rankin School of Flying, reported that during a recent terrific sleet and wind storm he landed on the Port of Portland Airport when he could not safely land on his own field nearby on the mainland. The air over the island was calm, he said. A Pacific Air Transport plane, carrying mail, landed there when it could not get through the fog anywhere else.

The wide causeway makes the island a part of the mainland for all practical purposes and offers the seaplane basin complete protection from wind disturbances. Although the island is not completed yet, about 100 acres have been raised, smoothed off and sodded. It will take about three months more to finish filling the causeway and the remainder of the

Line up of planes at the Portland Airport during the Spokane-Portland air race held last September after the National Air Races.

island. Swan Island rose only 12 ft. out of the water at its highest point. The Port of Portland Airport will be 34 ft. high in the middle and 32 ft. at the edges. Besides that, the island has been enlarged in area considerably.

The port is not hurrying completion of the field as the management wishes to have the sod in good shape, all power and water conduits in, and other necessary equipment in place before opening the field to general use.

Before starting construction on the airport, Mr. Polhemus toured the country visiting all principle landing fields and studying their plans and equipment. Armed with this data he returned and supervised the laying out of the Portland field.

No announcement has been made yet of the lighting equipment, except that boundary, beacon and flood lights will be the best obtainable. All power and water will be in conduits. Hangars will be temporary at first. As needs of the field are determined, permanent hangars, machine shops, office buildings and other structures will be erected.

Mr. Polhemus expects the field to be popular with flying schools. not only because of its location but also because people from many parts of the city will be able to view operations on the field. The school could not want better publicity, he said.

Air mail for Portland now lands in Vancouver, Wash., across the Columbia River. When the field is completed the stop will be transferred to Portland. The airport is just ten minutes from the main post office. Cost of the field will be about $2,750,000. It will be operated by the Port of Portland.

Incidentally, the City of Portland will be ready for the airport. Eleven Portland organizations dealing in air instruction, transportation or equipping have developed there. Over 350 pupils are now undergoing instruction in the five flying schools of the city. Most of these will move their flying classes to the municipal field when it is ready.

The Heinkel H.D.40

Continued from page 708

These doors are of large dimensions to facilitate the loading of freight.

Windows are provided so that the compartments receive ample light. The structure consists of four steel tubes for longerons with tubes and cables for cross bracing. The engine mount is of steel tubing held in place by four bolts. It is fixed to a tubular frame that also acts as a fireproof bulkhead. The fireproofing is a sheet of aluminum and asbestos. The pilot's cockpit is lined with light sheet metal though the rest of the fuselage is covered with fabric in the usual manner.

Dual wheel type control is installed in the cockpit employing cables working on brass rollers and ball bearings, those for the rudder and elevators being outside the fuselage, while those for the ailerons are inside the fuselage and upper wing. They are arranged so that they are easily accessible for inspection. Double cables are used on the elevator and rudder controls. Ailerons are mounted on the upper wing only. The horizontal stabilizer is adjustable from the pilot's cockpit, while the vertical fin is adjustable only on the ground. A divided type of under carriage is employed, with the wheels rotating about the lower longeron. Each unit is independent of the other, with the shock absorber unit contained in the member extending to the upper longeron. The tread is quite wide. An adjustable tail skid is suspended in rubber that acts as shock absorber.

All metal parts are treated with Lionoil, the tubes being treated both inside and outside. Welded parts are finished with a transparent varnish to facilitate their inspection. The fabric covering of the fuselage and wing and tail surfaces are treated with four coats of clear dope, one coat of pigmented dope and two coats of color lacquer.

The manufacturer's specifications on the H.D.40 when fitted with a Pratt and Whitney Wasp engine are as follows:

Span	57 ft.
Length	39 ft.
Height	14 ft.
Guaranteed pay load	2500 lb.
High speed	140 m.p.h.
Landing speed	54 m.p.h.
Climb with full load	3050 ft. in 8 min.
Range	5 hr.

William E. Arthur & Co. Receives Contract to Build Du Pont Hangar

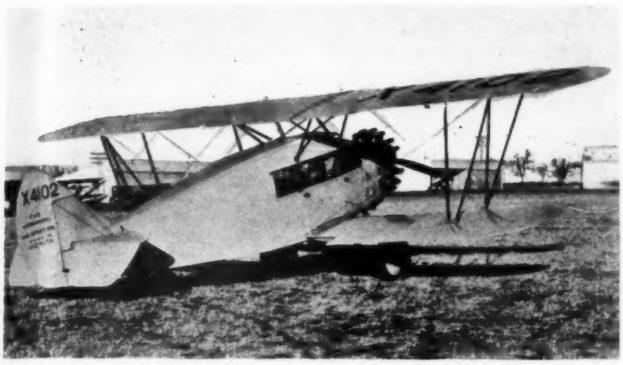
WILLIAM E. ARTHUR & Co., New York City airport engineers, have received a contract to build a steel and brick hangar, 60 by 60 ft. in size, on the Henry Belin Du Pont Field, Wilmington, Del., according to a recent report.

The Laird "Whippoorwill"

Continued from page 707

sort of transparent cupola over the head of the pilot, with windows at the side to increase the range of vision. As the leading edge of the lower wing is 14 in. behind that of the upper wing, the pilot can see the wheels when landing, and while in flight has some vision to the rear and below.

The cabin is large and roomy with the seats arranged in sedan fashion. It is partly divided into what might be called two compartments with ample leg room in either compartment. The interior finish is mohair, the color and design of which are optional with the purchaser. All exposed woodwork is of walnut, with balsa wood lining the walls of the cabin. The cabin is heated by an air intake in contact with the exhaust manifold which is faired into the cowling behind the engine. To prevent frosting of the windows in cold weather automatic windshield wipers are provided. The windows, which run the length of the cabin, are all fitted with a crank system similar to that on an automobile. Two doors are provided, the forward one being to the right of the pilot's seat in front of the lower wing, while at the right side of the cabin near the rear is another door for the passengers. The lower wing is reinforced near the fuselage to provide a walkway for the passengers.



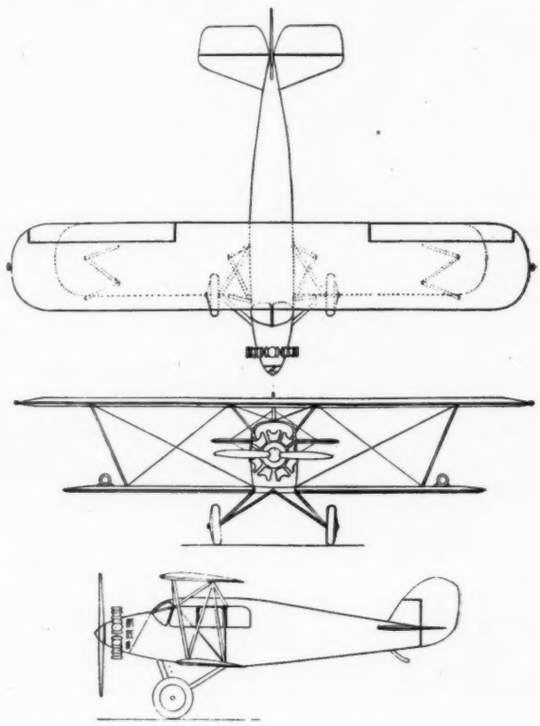
Rear quarter view of the Laird "Whippoorwill" manufactured by the Laird Aircraft Corp.

Wheel Type Control Provided

The pilot's cockpit is equipped with a complete set of Pioneer instruments with the exception of an earth inductor compass. Wheel type control is provided with all control mechanism, except that for the ailerons, of steel tubing. Cables are used for the aileron controls with the mechanism worked out so that the cables are all in a straight line thus eliminating pulleys. The leverages are such that very little effort is necessary to operate the controls. It is stated that it is easy to fly the Whippoorwill with one hand, as is customary with a stick control.

The engine is well cowled in with a spinner for the propeller. The mounting is of welded chrome molybdenum steel tubing, as is also the fuselage frame. The mount is attached to the fuselage by four 7/16 in. taper pins so that the engine unit may be removed easily and quickly. The instrument panel is mounted on this unit so that there is a minimum of connections to be broken when removing an engine. This idea, though not new, has not been employed in other planes that are in service on air mail and passenger routes. It provides a means whereby an engine can be replaced with a minimum of effort and time in almost as short an interval as that in which one can fuel up, load mail, or change passengers. In this way one can have an auxiliary power plant on hand that can be installed on very short notice. This would be economically advisable for an operator using many planes of the same type.

A tripod truss is used for the landing gear mounting with each unit independent of the other. The landing gear hinges about the lower longeron with the shock absorbing unit, of rubber chord in tension, in the member attached at the middle of the fuselage on the bottom. Wheel brakes are standard equipment. They are made by Sauzedde with both wheel and brake integral.



Three view drawing of the Laird "Whippoorwill"

The manufacturer's specifications on the Whippoorwill are as follows:

Length, overall	27 ft.
Height, overall	9 ft. 6 in.
Span, upper wing	36 ft.
Span, lower wing	30 ft.
Chord, upper wing	6 ft.
Chord, lower wing	4 ft. 10 in.
Wing area including ailerons	351 sq. ft.
Incidence both wings	2½ deg.
Weight empty	1650 lb.
Useful load	1000 lb.
High speed	125 m.p.h.
Cruising speed	105 m.p.h.
Landing speed	40 m.p.h.
Speed at take off	65 m.p.h.
Take off run with full load	400 to 500 ft.
Climb to 10,000 ft.	15 min.
Climb to 5,000 ft.	6 min.

The Whippoorwill was designed by Charles Laird of Wichita, Kan. He is director and chief engineer of the Laird Aircraft Corp. of which H. D. Cottman is president, W. H. Gaskins, vice president, and Leva D. Murray, secretary and treasurer. A. H. Hill, A. E. Hurford, and Bruce D. Billingsly are directors.

The Public Relations Counsel in Aeronautics

Continued from page 706

trade magazines was of major importance. In almost every instance a purchaser of aircraft and material, whether novice or pioneer in aeronautics, consults the trade magazines as a basis for comparison with other products in the field. We also reported that the trade advertising should carry a direct trade message as differentiated from the copy carried in other advertising.

We outlined the method and value of national advertising, of direct by mail advertising in the form of organization booklets, magazines and printed matter. We secured our information through disinterested advertising agencies and competi-

Anthony Fokker (left) greeting a group of Detroit millionaire business men who were served luncheon aboard the 10 passenger Fokker plane, in the background, while flying over the city of Detroit. The affair was conducted to advertise Fokker planes and the idea originated with the authors of this article.

tive companies. The industrial analysis further showed a plan for service and for the maintenance of contact with the industry and the public.

As part of this report the publicity program for 1928 in one case called for a series of stories from aircraft operators showing the results of the product of the client in actual service. Other trade magazine articles called for descriptions of manufacturing methods showing the high quality of workmanship and material. Throughout the year newspaper stories and photographs were planned for in advance and based on the program of production of the client.

As a result of such a report the client called a conference with the advertising agency, the sales manager, a member of our firm in charge of magazine articles, the publicity agent and the office executive in charge of preparing the printed literature. All the problems of sales, service, publicity, promotion and advertising were discussed with the end in view of correlating each effort to accomplish the desired result.

The aeronautical industry has one very important factor in its favor from a "news" angle, and yet one that is perhaps its weakest as well as its strongest link. It is a comparatively new industry and therefore subject to the vicissitudes of fortune that confront every new endeavor. But in being new and revolutionary it contains the factor of tremendous popular appeal.

Flying, a very few years ago, as we all know, was but a longed-for hope. Today it is a reality, a standardized and accepted mode of transportation, in addition to being an essential branch of military and naval warfare. It has had, and will continue to have, within itself, the real factor of "news". And having "news" value, the story of its activities will continue to be in demand by the public.

With such facts established, the work of public relations in the aeronautical field will grow in importance. Aviation as it continues to expand, must employ on an ever-widening scale that contact which only the reliable Public Relations Counselor can give in order to keep the press and the public informed of the facts. Aviation today enjoys world-wide confidence both as to stability and the possibilities which it offers for bettering communication facilities. It has created this confidence by the constructive research and development work which it has undertaken, by means of its epoch-making flights across the wide stretches of the Atlantic and Pacific oceans, by the many individual feats of world-famous pilots, and by the success which has attended the inauguration of the numerous mail and passenger traffic services.

The Public Relations Counselor has kept the public informed of these numerous activities. The chaff has been separated from the wheat and the true relation of these facts to the public presented. Assistance has been given in forming constructive policies of mutual benefit to the public and to the aeronautical industry itself.

Facts have been drawn up in the clear cut manner so that the press and the public get their full significance; and last but not least, the people of the industry have been brought together thereby consolidating community of interest for the benefit of all.

Olympic Aeronautical Corp. Formed In Washington to do Sales Work

PAPERS HAVE been taken out in the State of Washington for the incorporation of the Olympic Aeronautical Corp. of which J. Barton Story, Eaglerock distributor in western Washington, will be president. The company will sell Eaglerock planes.

Aside from sales work the company is establishing a scenic air line around Mt. Tacoma, formerly known as Mt. Rainier. After May 1 three trips a day will be made, requiring from two to three hours.

Aero Club is Formed by Members Of Edo and Sikorsky Corporations

MEMBERS OF the Sikorsky Mfg. Corp. and of the Edo Aircraft Corp., both of College Point, L. I., N. Y., have joined to form an aero club. Further recruits will be gathered from aeronautical enthusiasts in the town.

Temporary officers elected at the first meeting are C. Sshindler, president; J. Schlee, vice president; F. J. Baron, secretary; and J. Muldore, treasurer. Mr. Schindler is at present drawing up plans for a plane which is to be built by the members and used for instruction purposes.

"Lamoglas" is New Name of Beck Distributing Corp. Aero Goggles

THE BECK Distributing Corp., which has been marketing a complete line of aviators' goggles under the name of "Duroglas", has decided to change the name of the product to "Lamoglas". This change was brought about when the Beck Distributing Corp. found that another manufacturer had been using a similar name "Duraglas", for some time. The company wishes to make clear to their dealers that there will be no change of quality of the product, the new name of which will be advertised shortly.

Review of Mechanics

Continued from page 705

and $c = \frac{wL^4}{8EI}$

Whence $y = \frac{wx^4}{24EI} - \frac{wL^3x}{6EI} + \frac{wL^4}{8EI}$ = Elastic Curve of Beam.

When $x = 0$.

$$y = \frac{wL^4}{8EI}$$

And so it is readily seen that there is a definite relation between all these quantities.

A consideration of the expressions given above will uncover several interesting relations other than those already mentioned.

Thus: $M = \int S\,dx$ or $\frac{dM}{dx} = S$

From a consideration of maxima and minima if $S = 0$, M is a maxima. And so to find a point of maximum moment

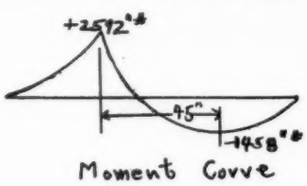


Fig. 23.

we need only locate the point where the shear is zero, i.e. where the shear curve crosses the axis.

Also: $EIi = \int M\,dx$ or $EI\frac{di}{dx} = M$

When $M = 0$, the slope of the tangent to the elastic curve at that point is a maximum and the curve changes from concave upward to concave downward. This is known as a "point of inflection". The moment and slope to one side of this point are positive and to the other side negative. Wherever the moment curve crosses the axis is a point of inflection.

And: $EIy = \int EIi\,dx$ or $\frac{dy}{dx} = i$

When $i = 0$, the deflection y is a maximum. Between two adjacent points of inflection, i must be zero at some one point. That then is the point of maximum deflection.

In our work it will be assumed that x is measured from left to right and that up forces are positive. The signs for

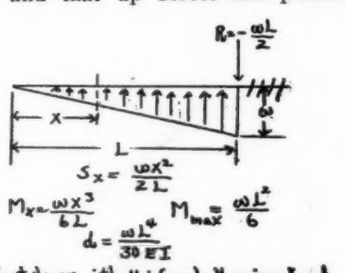


Fig. 24.

shear, moments, etc. resulting from the applications of the above expressions will then be as in Fig. 20.

An up force acting to the left of the section under consideration will give a positive shear and a positive moment. Then of course a down force acting to the left of the section gives a negative shear and moment. The deflection and

Sunday crowds at Curtiss Field, L. I., N. Y.

Control the over-enthusiastic crowd

PUBLIC interest in aviation is climbing steadily upward. Every holiday finds crowds flocking to a landing field. More and more are learning the thrill of flying from short "pleasure hops."

In their curiosity and enthusiasm these visitors rush for an alighting plane . . . cluster about a plane that is "taking-off". They endanger their own lives and the lives of flyers . . . annoy pilots and mechanics . . . waste valuable time.

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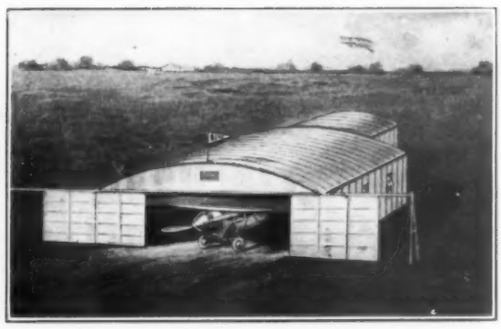
HANGARS



Esline Round Roof "T" Hangar

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No posts — no columns — entire floor space clear for handling ships. Fireproof. 100% salvagable. Take down and reerect on another location at any time — and with a minimum loss of time.

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slope resulting from an up or plus force acting on the beam are positive as shown. A down force gives a negative deflection and slope. These signs are all logical and agree with the conventions used in analytical geometry. They do not agree with most mechanics books as such books deal chiefly with down loads and deflections which they naturally consider positive in their work. Hence the signs of our equations will vary somewhat from those in mechanics books which have been founded more on civil engineering practice.

An illustrative example will be worked out to show the relations between shear and moments on a beam. The example chosen has the type of loading that actually occurs on

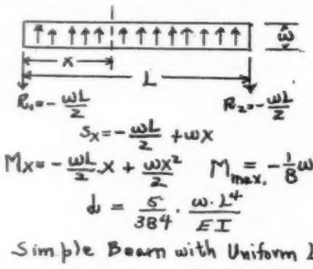
ω
x
L
$R_1 = -\frac{\omega L}{2}$
$R_2 = -\frac{\omega L}{2}$
$S_x = -\frac{\omega L}{2} + \omega x$
$M_x = -\frac{\omega L}{2}x + \frac{\omega x^2}{2}$
$M_{max.} = -\frac{1}{8}\omega L^2$
$d = \frac{5}{384} \cdot \frac{\omega \cdot L^4}{EI}$
Simple Beam with Uniform Load

Fig. 25.

an airplane wing where the inner support is pinned and so has no moment present at that point. Fig. 21 shows the magnitudes of the loads and the dimensions of the beam.

COMPUTATIONS

Reactions:—

εM about point 2:—

$$R_1 \times 72 + 4(36 + 72)\frac{(36 \times 72)}{2} = 0$$

$R_1 = -324$ lb. acting down

εM about point 1:—

$R_2 \times 72 - 72 \times 4 \times 36 + 36 \times 4 \times 18 = 0$

$R_2 = 108$ lb. acting down to cause clockwise moment about point 1.

Moments at Supports:—

Only forces to the left of a point are used in figuring the moment at that point.

$$M_1 = 36 \times 4 \times \frac{36}{2} = +2592 \text{ in lb.}$$

$$M_2 = \frac{(72 + 36)^2 \times 4}{2} - 324 \times 72 = 0$$

That M_2 must equal zero is evident because Station 2 is not restrained but may pivot as it pleases.

Shear Loads:—

At left of station 1:—

$S_{-1} = 36 \times 4 = +144$ lb. acting up

S_{+1} = the shear just to the right of station 1

May be determined by two methods:—

1) $S_{+1} = P_{-1} + S_{-1} = -324 + 144 = -180$ lb.

2) $M_2 = M_1 + S_{+1}L + \frac{wL^2}{2}$

$$0 = 2592 + S_{+1} \times 72 + \frac{4 \times 72^2}{2}$$

$S_{+1} = -180$ lb.

Method (1) is used when the reactions are known.

$S_{-2} = S_{+1} + \varepsilon V$ between 1 and 2.

$S_{-2} = -180 + 4 \times 72 = +108$ lb. $= -R_2$

Moment in span:—

The maximum moment in the span occurs where the shear is zero. The shear is zero at

$$x = \frac{S_{+1}}{w} = \frac{180}{4} = 45 \text{ in. to the right of Station 1.}$$

The moment at this point is:—

$$M_{45} = M_1 + S_{+1}45 + \frac{w \times 45^2}{2}$$

$$M_{45} = 2592 - 180 \times 45 + \frac{4 \times 45^2}{2} = -1458 \text{ in. lb.}$$

Then having our shear and moment values for a number of points we can draw the curves as in Figs. 22 and 23.

As previously mentioned the bending moment at any point or the ordinate to the bending moment diagram at that point

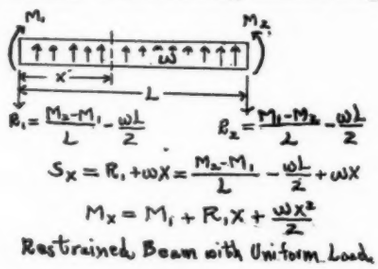

Fig. 26.

is equal to the algebraic sum of the areas under the shear curve to the left of that point. Thus we could find the maximum moment between Stations 1 and 2 by adding the two triangles at the left of the shear diagram.

$$\frac{144 \times 36}{2} - \frac{180 \times 45}{2} = -1458 = M_{45}$$

Another important relation that we have made use of above in computing M_{45} is that the moment at any point x can be determined if we know the moment at some other section, 1, to the left of x, the shear at section 1 and the loads between sections 1 and x. The relation between these quantities is:

$$M_x = M_1 + S_{+1}x + \varepsilon Vxa$$

Where S_{+1} is the shear just to the right of Section 1

x is the distance between Sections 1 and x.

εVxa is the moment of all forces between 1 and x about x.

Several types of beam loading recur so frequently that it is advisable to work ont one general case for each and have

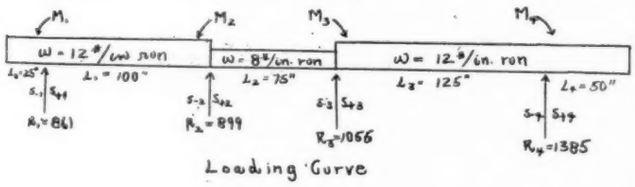

Fig. 27.

the resulting formulas handy for ready substitution. Formulas for several types of ordinary loadings on simple beams are given below.

When a beam is continuous over three or more supports it can no longer be solved by the application of the principles of statics. At most we know that $\varepsilon M = 0$ and $\varepsilon V = 0$, which leaves us with n-2 unknowns where n is the number of supports. The theorem of three moments furnishes us with a series of equations which supply the necessary conditions to determine the unknowns. The three moment equation is:

$$M_1L_1 + 2M_2(L_1 + L_2) + M_3L_2 = \frac{w_1L_1^3}{4} + \frac{w_2L_2^3}{4}$$

Where: 1, 2, 3, are the three supports in order

w_1 is the uniformly distributed load in span 1-2.

w_2 is the uniformly distributed load in span 2-3.

M_1, M_2, M^3 are the moments at their respective supports

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Seating Capacity	pilot and 4 pass.
Weight Empty	2100 lbs.
Wing Area	320 sq. ft.
" Span	42 ft.
High Speed (sea level)	120 M.P.H.
Engine,	Wright Whirlwind

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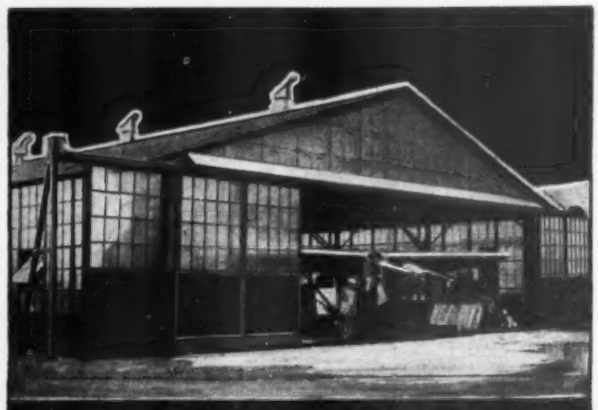

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L_2, L_3 are the lengths of the spans 1-2, and 2-3 respectively.

A numerical example will be carried through to completion as the best method of explaining the use of the equation. Assume a beam loaded as in Fig. 27 and supported at four points 1, 2, 3, and 4. Compute the shears, reactions, and moments, and draw the shear and moment curves for the beam.

Moments at supports:—

$$M_1 = \frac{-12 \times 25^2}{2} = -3750 \text{ in. lb.}$$

$$\text{and } M_4 = \frac{-12 \times 50^2}{2} = -15{,}000 \text{ in. lb.}$$

Then applying the equation:

$$M_1L_2 + 2M_2(L_2 + L_3) + M_3L_3 = \frac{w_1L_2^3}{4} + \frac{w_2L_3^3}{4}$$

$$-3750 \times 100 + 2M_2(100 + 75) + M_3 \times 75 = \frac{-12 \times 100^3}{4} + \frac{-8 \times 75^3}{4}$$

(a) $350M_2 + 75M_3 = -3{,}468{,}750$ in. lb.

Now moving one support to the right, we have:

$$M_2L_3 + 2M_3(L_3 + L_4) + M_4L_4 = \frac{w_2L_3^3}{4} + \frac{w_3L_4^3}{4}$$

$$M_2 \times 75 + 2M_3(75 + 125) + (-15{,}000 \times 125) = \frac{-8 \times 75^3}{4} + \frac{-12 \times 125^3}{4}$$

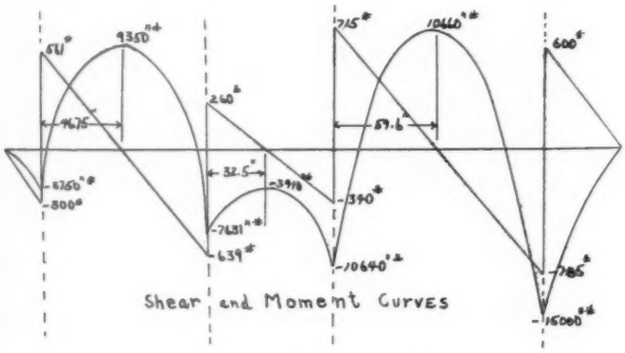


Fig. 28.

(b) $75M_2 + 400M_3 = -4{,}828{,}125$ in. lb.

Solving equations (a) and (b) simultaneously:

$M_2 = -7631$ in. lb.

$M_3 = -10{,}640$ in. lb.

Shears and Reactions:—

$$S_{-1} = -12 \times 25 = -300 \text{ lb.}$$

$$M_2 = M_1 + S_{+1}L_2 + \frac{w_1L_2^2}{2}$$

$$-7631 = -3750 + S_{+1} \times 100 + \frac{-12 \times 100^2}{2}$$

$$S_{+1} = \frac{(3750 - 7631)}{100} + \frac{12 \times 100^2}{2 \times 100} = +561 \text{ lb.}$$

$$R_1 = S_{+1} - S_{-1} = 561 - (-300) = +861 \text{ lb.}$$

$$S_{-2} = S_{+1} + \varepsilon_1^2V$$

$$S_{-2} = 561 + (-12 \times 100) = -639 \text{ lb.}$$

$$M_3 = M_2 + S_{+2}L_2 + \frac{w_2L_3^2}{2}$$

$$-10{,}640 = -7631 + S_{+3} \times 75 + \frac{-8 \times 75^2}{2}$$

$$S_{+3} = \frac{(7631 - 10{,}640)}{75} + \frac{8 \times 75^2}{2 \times 75} = +260 \text{ lb.}$$

$R_3 = S_{+3} - S_{-2} = 260 - (-639) = +899$ lb.

$S_{-3} = 260 + (-8 \times 75) = -340$ lb.

$$M_4 = M_3 + S_{+3}L_3 + \frac{w_3L_3^2}{2}$$

$$-15000 = -10640 + S_{+3} \times 125 + \frac{-12 \times 125^2}{2}$$

$$S_{+3} = \frac{(10640 - 15000)}{125} + \frac{12 \times 125^2}{2 \times 125} = +715 \text{ lb.}$$

$R_3 = S_{+3} - S_{-3} = 715 - (-340) = +1055$ lb.

$S_{-4} = 715 + (-12 \times 125) = -785$ lb.

$S_{+4} = 12 \times 50 = 600$ lb.—being computed from right to left for simplicity.

$R_4 = S_{+4} - S_{-4} = 600 - (-785) = 1385$ lb.

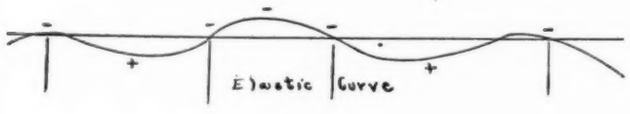


Fig. 29.

Check of shear:

$\varepsilon V = \varepsilon R$

$12(25 + 100 + 125 + 50) + 8 \times 75 =$

$861 + 899 + 1055 + 1385$

$4200 = 4200$

Moments in Span:—

Points of zero shear:—

Span 1-2:— $X_1 = \frac{S_{+1}}{w_1} = \frac{561}{12} = 46.75$ in. from R_1

Span 2-3:— $X_2 = \frac{S_{+2}}{w_2} = \frac{260}{8} = 32.5$ in. from R_2

Span 3-4:— $X_3 = \frac{S_{+3}}{w_3} = \frac{715}{12} = 59.6$ in. from R_3

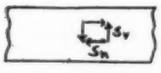


Fig. 30.

The maximum moment occurs at points X_1, X_2, X_3 in the spans.

$$M_{3-b} = M_3 + \frac{w_3X_3^2}{2} + S_{+3}X_3$$

$$M_{1-2} = -3750 - \frac{12 \times 46.75^2}{2} + 561 \times 46.75 =$$

$+ 9350$ in. lb.

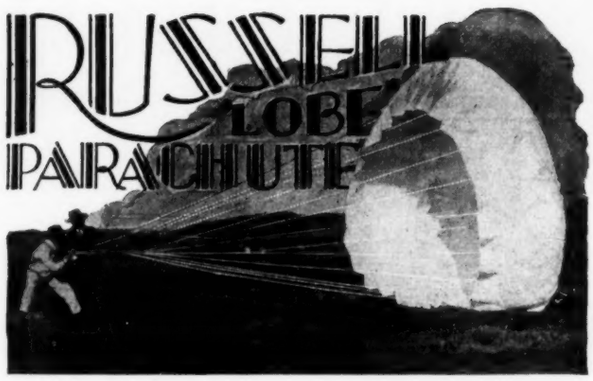
$$M_{2-3} = -7631 - \frac{8 \times 32.5^2}{2} + 260 \times 32.5 =$$

-3410 in. lb.

$$M_{3-4} = -10640 - \frac{12 \times 59.6^2}{2} + 715 \times 59.6 =$$

$+10660$ in. lb.

It is important to remember in drawing the shear and moment curves that a point of zero shear is a point of maximum



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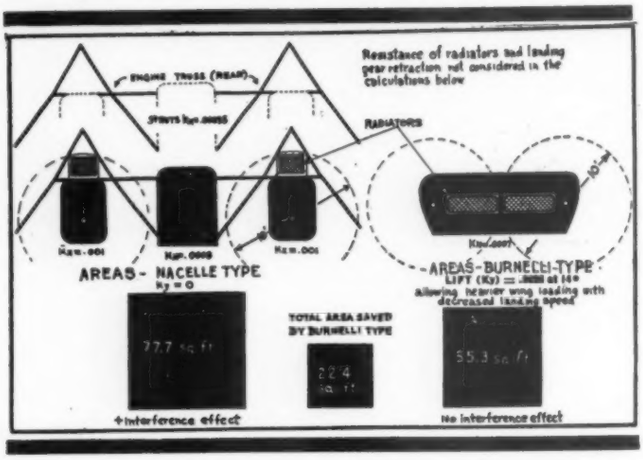

Resistance of radiators and landing gear retraction not considered in the calculations below
RADIATORS
AREAS - NACELLE TYPE
AREAS - BURNELLI TYPE
Allowing heavier wing loading with decreased landing speed
TOTAL AREA SAVED BY BURNELLI TYPE
77.7 sq. ft.
22.4 sq. ft.
55.3 sq. ft.
+Interference effect
No interference effect

THE following test pilots have contributed to the demonstration of satisfactory control and advancement in design of the Burnelli airfoil fuselage multiple engined type through the operation of the giant RB1 and 2. Bert Acosta, Clarence Coombs, Randolph Page, Lloyd Bertaud, Edward Stinson, Howard Rinehart, George Pond, Romer Weyant, Homer Berry and Earl White.

Some Advantages of the

BURNELLI TYPE

Accessible multiple engine compartment
Extensive reduction of head resistance
Reduced turning moment on one engine
Fuselage lift reduces landing speed
Increased capacity of the fuselage
Structural efficiency and simplicity
Practical Landing Gear Retraction

REMINGTON AIRCRAFT CORP. BURNELLI

247 PARK AVENUE, NEW YORK CITY

moment. Wherever the shear curve crosses the axis the moment curve is a maximum distance away.

The equation of three moments can be applied to any number of spans. With three supports it need only be applied once and for each extra support it must be applied an additional time. Starting with the first interior span at the left we move one span to the right for each new application until the right interior span is reached. No matter what two spans we are considering M_1 is always the moment at the left end of the left span; M_2 is the moment between the two spans; M_3 is the moment at the right end of the right span.

In Fig. 29 an approximate outline of the curve taken by the beam has been drawn. It is to be noted that when the curve is concave downward the moment on the beam is negative; when the curve is concave upward the moment is positive. If we are in doubt as to the sign of a moment a rough approximation of the elastic curve of the beam at that point will determine the sign.

To maintain equilibrium the external shear at any section of a beam must be resisted by an internal shear within the

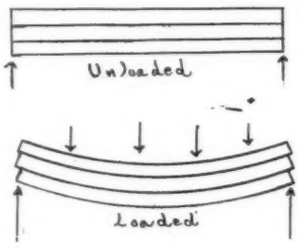


Fig. 31.

section. This internal shear is distributed over the entire section but not equally. The intensity of this shear at any point may be computed from:

$$f_s = \frac{SQ}{bI}$$

Where S = Total external shear at section
b = Width of beam at section
I = Moment of inertia of whole cross-section
Q = Statical moment—or moment of the area included between the line being investigated and the nearest surface of the beam, about the neutral axis of the entire cross-section.

From this formula it follows that the shearing stress will be a maximum about the neutral axis. If b varies however and is sufficiently small at some other point in the section, that point may be most heavily stressed. This occurs rarely however.

The maximum intensity of shearing stress (i.e. at the neutral axis) of a rectangular cross-section will be found by substituting values in the above equation to be:

$$f_{s\max} = \frac{3S}{2A}$$

where A is the total area of the section.

The internal vertical shear at any section induces an equal horizontal shear at every point in that section. This is illustrated in Fig. 30. This shear is very important when dealing with wood as it acts along the grain of the wood in which direction it is weakest. To visualize this stress imagine a load being applied to a beam comprised of several planks one resting upon the other. The result is as shown in Fig. 31. There is no resistance to shear between the planks and so they slide one on the other. Where but one plank forms the beam the material in the plank must resist the horizontal shear. One plank is stronger than a combination of planks of the same total dimensions.

Example of Computations for Horizontal Shear Stresses.

Take a beam of cross-section as shown in Fig. 32.

Find the horizontal shear at line A-A and the maximum horizontal shear due to a total shear load of 1200 lb.

For line A-A:

$$Q = 2 \times 3 \times 4 = 24$$

$$b = 3$$

$$I = \frac{bd^3}{12} = \frac{3 \times 10^3}{12} = 250 \text{ in.}^4$$

$$f_s = \frac{1200 \times 24}{3 \times 250} = 38.4 \text{ lb.}$$

The maximum shear will occur at the neutral axis.

$$Q = 3 \times 5 \times 2.5 = 37.5$$

$$f_{s\,max} = \frac{1200 \times 37.5}{3 \times 250} = 60 \text{ lb.}$$

The stress in a straight column is equal to P/A when the load applied is an axial load at the c.g. of the column. P is the total load applied and A is the cross-sectional area of the material in the column. When the load is a tension

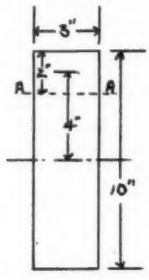


Fig. 32.

the allowable value of P/A is the ultimate strength of the material. For compression loads the allowable value depends upon the length of the column.

For very short columns the allowable stress very nearly equals the stress at the yield point of the material. Johnson's Parabolic Formula is most often used to compute the allowable stress in short columns.

$$P/A = F - \frac{F^2}{4c\pi^2E}(L/\rho)^2$$

Where F = yield point of material
E = modulus of elasticity of material
L = length of column in inches
ρ = least radius of gyration of column
c = a constant depending upon the fixity of the ends
for pin ends c = 1
for fixed ends c = 4

In aeronautics work C = 2 is maximum value allowed. For longer columns the maximum P/A is given by Euler's Formula.

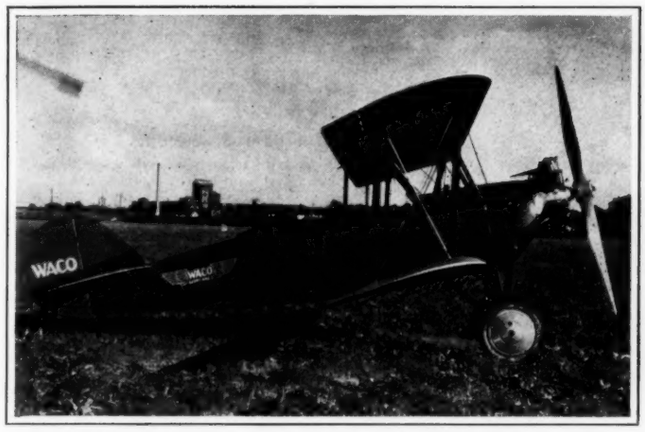
$$P/A = \frac{c\pi^2E}{(L/\rho)^2} = \frac{c\pi^2EI}{L^2}$$

Where I = moment of inertia of cross-section of column
c has same values as in Johnson's Formula

The decision as to which formula must be used for any given column depends upon the slenderness ratio or L/ρ of the column. This ratio varies for each material and will be given in a subsequent chapter with the properties of the materials.

The maximum value of c = 2 is allowed for welded joints. Other types of construction must be judged on their merits and a value of c somewhere between 1 and 2 allowed.

It has been proven previously that the maximum stress across any section due to a bending moment M is equal to:



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$f_b = My/I$

Where M = bending moment
y = distance from neutral axis to the outermost fibers of the beam.
I = moment of inertia of the section.

In addition a beam is often subjected to an axial load, either compression or tension. The stress imposed on the section by these axial loads is equal to P/A in which

P = total axial load
A = area of the section

The total stress on a section is equal to the sum of the axial and bending stresses.

$f_t = My/I \pm P/A$

If the axial load P is tension it will increase the stress across the section and therefore in the formula the + sign should be used. If P is compression the reverse will occur and the — sign should be used.

Where the deflection of the beam can be determined the secondary bending moment due to the axial load times the deflection should be added to the foregoing formula.

Then $f_t = My/I \pm P/A \pm Pdy/I$

Where d = deflection of beam as shown in Fig. 33.

Tension will cause a secondary bending moment that will relieve the stress. This is illustrated in Fig. 33 where it is obvious that the tension force is tending to straighten out the beam. The secondary bending moment due to a compressive load will increase the stress and its sign is therefore positive.

As stated above the ultimate strength of the material is used for the allowable load in tension. Care should be taken however to deduct for any slots or rivet or bolt holes that may be present in the member. In bending, the allowable unit stress is the modulus of rupture. For metal the modulus of rupture and the ultimate strength are taken as equal and considered constant for all sections. With wood the modulus varies for each section and it is necessary to use a form factor to determine the allowable stress. Detailed data on this factor will be given with the properties of spruce in a later chapter.

When the stress in a metal member is a combination of tension and bending the allowable combined stress F_t is the modulus of rupture. When the stress is caused by a combination of compression and bending, the value of F_t is between the yield point and the modulus of rupture of the material. The greater the ratio of the bending stress to the total stress, the nearer the modulus of rupture is the allowable value. The formula for this allowable stress is:

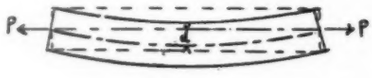

Fig. 33.

$$F_t = \frac{f_b}{f_t}(F_b - F_c) + F_c$$

Where F_t = allowable combined stress
$f_b = My/I$ = bending stress
$f_t = f_b + f_c = My/I + P/A$ = total applied stress
F_b = allowable bending stress = modulus of rupture
F_c = allowable compressive stress = yield point

Numerical Example of Combined Compression and Bending Stress

Find the allowable combined stress of a 1½ in. x .065 in. steel tube subjected to a 5000 lb. compressive load and a bending moment of 1000 in. lb. What is the margin of safety?

Properties of Tube: A = .293 sq. in. I = .0756 in.⁴

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It is no wonder, then, that Edo production is doubled since last year. The question is, will doubled production be sufficent to take care of ever increasing demand for floats? We thought so in January, but we begin to doubt now. As the Sun gets warmer, orders come more and more often. Do not postpone yours too long if you want to be certain of your delivery.

EDO

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STANDARDIZED ALL METAL SEAPLANE FLOATS

F_b = 55000 lb. per sq. in. F_c = 36000 lb. per sq. in.

$$f_b = My/I = \frac{1000 \times .75}{.0756} = 9920 \text{ lb. per sq. in.}$$

$$f_c = P/A = \frac{5000}{.293} = 17060 \text{ lb. per sq. in.}$$

f_t = 26980 lb. per sq. in.

$$F_t = \frac{9920}{26980}(55000 - 36000) + 36000 = 43000 \text{ lb. per sq. in.}$$

The total applied stress f_t = 26980 while the total allowable stress F_t = 43000 lb. per sq. in. The margin of safety then is:

$$\text{M. of S.} = \frac{43000 - 26980}{26980} = .59 = 59\%$$

In all the foregoing formulas it is to be noted that inches and pounds are used exclusively. It has been found best in aeronautical work to transform feet to inches immediately and work throughout with the smaller unit. This eliminates a great many fractions which are always a source of error. If we adhere consistently to inch pound units the formulas will take care of themselves and our answer will come out in some variation of in. lb.

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To be continued in the next issue of AVIATION

Manlius Military School Planning Landing Field for Students' Use

ONE OF the first landing fields at a military school will be established at the Manlius School, 11 mi. east of Syracuse on the Cherry Valley Highway, according to a recent announcement. The field will run 3,000 ft. north and south and about 1200 ft. east and west. The prevailing winds are from the north or south.

Col. Guido F. Verbeck, superintendent of the Manlius School, in announcing plans for establishment of the field said that it was in line with recent developments in aviation.

"We have planned for sometime to establish several athletic fields in one large plot," he said, "and we have now decided to use this plot as a landing field as well. The field will be marked with a wind indicator and center circle, as prescribed by the regulations, and will be completely leveled."

Gordon K. Hood, manager of the Syracuse Airport, will assist school officials in laying out the field. Dedication ceremonies with several planes participating are being planned for the early summer.

Airport Construction is Proposed By 26 Municipalities in 19 States

THE FOLLOWING 26 municipalities have lately proposed airports, according to a Department of Commerce report; Yuma, Ariz.; Fitzgerald, Ga.; Moultri, Ga.; Waukegan, Ill.; St. Charles, Ill.; East St. Louis, Ill.; Wichita, Kan.; Watertown, Mass.; Owosso, Mich.; Ann Arbor, Mich.; Argyle, Minn.; Brookhaven, Miss.; Helena, Mont.; Terry, Mont.; Keene, N. H.; Hudson, N. Y.; Marion, N. C.; Lima, O.; Tulsa, Okla.; El Reno, Okla.; Klamath Falls, Ore.; Montrose, Pa.; Georgetown, S. C.; Abilene, Tex.; Wichita Falls, Tex.; and Staunton, Va.

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Airplane Tires and Inner Tubes

Continued from page 703

"overhang" to the tire to protect the rim flanges when the wheels and tires were running over ruts, or on frozen ground. To correct this condition, the rim widths of the 4 and 5 in. rims were reduced to 2.5 in. and the other sizes were unchanged.

The question of oversizing tires is largely tied in with rim design, as well as with wheel diameters. Oversizing, in the case of standard Air Corps tires, is possible with the 5, 6, and 8 in. tires and, upon the completion of the new 10 in. tire, that, too, will permit of oversizing. The wheels on which the 4, 5, 6, 8, and the new 10 in. tires are mounted, are all 20 in. in diameter, although other factors such as rim width, depth of well, width of flange, etc. differ. This fact makes it possible to oversize as follows:

30 x 5 tire on 28 x 4 wheel
32 x 6 tire on 28 x 4 wheel
32 x 6 tire on 30 x 5 wheel
36 x 8 tire on 32 x 6 wheel
40 x 10 tire on 36 x 8 wheel

It was thought at first that oversizing two sizes, such as the 32 x 6 tire on the 28 x 4 wheel, would give an unstable combination, tending to roll the tire off the rim, due to pulling in the tire beads at the rim. An extended service test of this installation, as well as the 36 x 8 tire on the 32 x 6 wheel, indicated conclusively that such oversizing is not unstable but, in fact, is highly desirable. See Fig. 2. The Angle of Stability of a tire mounted on a rim is the angle formed by a line

A = Rim Width
B = Bead Seat
C = Gage of Rim
D = Flange Width
E = Flange Height
F = Depth of Well

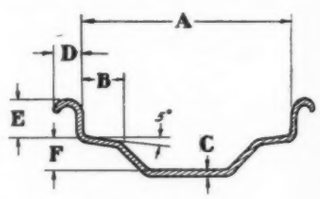


Fig. 3. Standard drop center airplane rim.

from the heel of each bead to the center line of the tire tread, as shown on Fig. 4. This angle on automobile tires is usually limited to a maximum of 28 deg., as any lesser angle would permit of recking, or rolling of the tire. Automobile practice was followed for some time with airplane tires until difficulties were encountered in service by the rim flanges bending when striking on ruts or frozen ground, as mentioned previously. To overcome this difficulty, oversizing two sizes was resorted to, which resulted in reducing this angle to 21 deg. in some cases without any difficulty being encountered. It is plain that conditions of stability which hold for automobile tires do not apply to airplane tires. In this connection it can be stated as a principle of rim design for airplane tires that the rim with is preferably 0.5 to 0.6 of the tire section rather than 0.7, which is a common dimension for automobile equipment.

The design of airplane inner tubes on drop center rims involves some considerations not included in the design of automobile tubes which are used on flat base rims. Due to the contour of the drop center rim, which requires that the inner tube fit smoothly and evenly without wrinkling or buckling, it is necessary that care be taken in the measurements of pole diameter and tube length. With these considerations provided for, the flat width or the pole diameter of the tubes will be greater, and the mean tube length will be less for tubes used on drop center rims than for tubes used on ordinary flat base rims.

The result of experimental work and service testing of inner tubes has led to the adoption of the following specification requirements for inner tubes.

Inner tubes shall be of the endless type only.

The inner tube shall be made from the best quality washed and dried plantation rubber, or its equivalent, and shall be

so compounded and vulcanized to produce a tube which shall age well under service conditions. No reclaimed rubber, oil substitute, or any material which shall tend to decrease the life of the tube shall be used.

The tubes shall have the analytical and physical properties contained in Table IV. The tube wall thickness, tube length, weight of tubes equipped with valve lock nut, rim nut, valve cap, etc., shall conform to the requirements as shown in Table V. Each tube shall be properly fitted with one valve, Schrader 2791, or other approved air valve. This valve shall be equipped with a lock nut, rim nut, and valve cap, Schrader 880, or equivalent.

TABLE II.
Pressure, Load, Contact Relationship of Airplane Tires

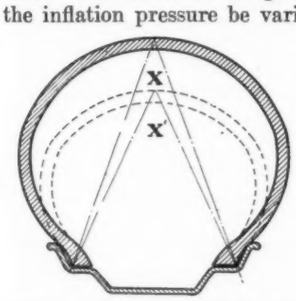
Size	Inflation Pressure (Lb./Sq. In.)	Deflection (Per cent.)	Area of Contact Diagram (sq. inches)	Load per sq. in. of Contact Area (pounds)	Deflecting Load (pounds)
28 x 4	50	25	23.4	55.5	1300
28 x 4	50	50	45.1	53.5	2400
28 x 4	65	25	23.1	67.5	1560
28 x 4	65	50	44.0	66.0	2900
32 x 6	50	25	43.0	50.0	2200
32 x 6	50	50	87.0	54.0	4700
32 x 6	65	25	39.3	66.2	2600
32 x 6	65	50	86.3	69.5	6000
36 x 8	50	25	69.4	52.0	3600
36 x 8	50	50	136.9	58.5	8000
36 x 8	65	25	73.5	66.6	4900
36 x 8	65	50	140.6	71.2	10000
44 x 10	50	25	93.4	53.5	5000
44 x 10	50	34	150.2	55.5	8320

The splice shall be as strong as the body of the tube. The spliced ends shall be properly skived, so as to avoid an abrupt or unnecessary increase in the thickness of the tube at the splice.

All tubes shall be tested in accordance with Specification 20-1. (This specification covers the standard methods of testing rubber).

The finished tires are tested as described above under Construction and Performance, but there are a number of other interesting phases of testing which are worth considering. In general, the load-deflection performance of airplane tires is the factor which limits the use of tires of a given size, and maximum tire life can only be expected when this deflection does not exceed 25 per cent. of the total vertical deflection which is possible. On this premise, the working loads of tires are specified, and it is possible, in this way, to cover practically all weights of military airplanes. Load-deflection data for tires are not limited to a 25 per cent. deflection, however, as maximum performance, rather than maximum life, may be desirable under military conditions; consequently, load-deflection data must be available on all tires up to 100 per cent. vertical deflection.

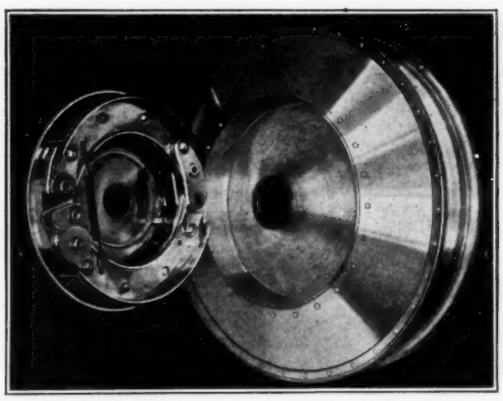
Fig. I shows the load-deflection data for standard airplane tires at standard service pressures. It will be noted that if the inflation pressure be varied for a given tire, the slope of the load-deflection curve remains the same, but the curve moves to the right or left, paralleling the original curve, as the inflation pressure is lowered or raised. It will be seen from this that the load required to produce 25 per cent. vertical deflection can be varied between fairly wide limits, depending upon the demands made upon the tire.



X′ = Original angle 30°-40° on standard installation.
X = Oversized angle 21°-33°.

Fig. 4. Change of angle of stability as a result of oversizing.

In an earlier portion of this article, the "snow shoe" effect was referred to, which will be discussed in the following.



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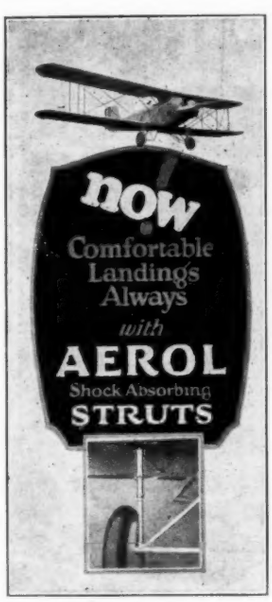

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When a tire is stationary and is supporting a load, a certain portion of the tire is in contact with the supporting surface. The Contact Diagram made by the tire on the supporting surface is an ellipse, and the pressure per square inch on the supporting surface is the same as the pressure in the tire. The total load supported by the tire is equal to the area of the contact diagram in square inches, multiplied by the inflation pressure of the tire in pounds per square inch. This is rather a broad statement and is not entirely correct, as there are several other variables which should be considered. However, for all practical purposes, these variables may be disregarded. The true load which a tire will support is equal to the area of the contact diagram in square inches multiplied by the pressure in pounds per square inch in the tire, at the deflection caused by the load.

Consideration of the above will show that the area of the contact diagram can be increased by reducing the inflation pressure, or can be decreased by increasing the inflation pressure. In the first case, an increase in the area of the contact diagram is desirable when the surface from which the airplane is operating is soft, and minimum sinking of the wheel and tire is essential. In the second case, a decrease in the contact diagram is desirable when it is necessary to carry larger loads, and the surface is sufficiently firm to support these larger loads.

TABLE IV.
Chemical and Physical Properties of Inner Tubes

Type	Class	% Rubber by Volume (min.)	Organic Acetone Extract (max. %)	Total Sulphur (max. %)	Gypsum	Tensile Strength (min.) Lb./sq. in.	Ultimate Elongation (min.) %	Set Stretch 1 in. to 6 in. (max.)
Pure Gum	A	93	5.0	7.0	—	1800	750	10
Antimony	B	85	5.0	7.0	7.0	2000	725	10
Compounded	C	80	5.0	7.0	—	2500	600	15

Another interesting phase of the question of airplane tire performance is the relation between the tire contact diagram, its load per square inch of tire contact, the supporting load, and the inflation pressure of the tire. This relation, worked out empirically, is true only between reasonable limits and when the tire being tested is circular in section. However, since this relationship is quite interesting, it is presented here.

In a series of tests to determine this relationship, standard tires of 4, 6, 8, and 10 in. sections were used. The values, as tabulated, were actually measured in all cases and, while there are a few inconsistencies, the tendencies are well defined and can readily be seen. Table II shows the values obtained.

TABLE V.
Physical Data for Airplane Inner Tubes

Size	Thickness inches (min.)	Weight pounds (max.)	Tube Length Inches	Recommended Pole Diameter Inches
28 x 4	.060	2.0	*35 to 35.25	2.50 straight
30 x 5	.060	2.5	**63.5 to 64.5	3.50 curved
32 x 6	.065	3.0	**64.5 to 65.5	4.25 curved
36 x 8	.070	5.0	**65.0 to 66.0	5.25 curved
44 x 10	.090	11.5	100 to 102	—
54 x 12	.115	16.75	123 to 125	8.75 curved

Notes:
*The Tube Length of the 28 x 4 on a straight mandrel, is measured on the deflated tube as a flat length, and is one half the true tube length.
**These dimensions are the inside circumferences of the tubes which are made on curved mandrels, and cannot be measured flat. This dimension is obtained when the tube is inflated to 1¼ pounds pressure. The correct pressure is best obtained when the valve core is removed, and the valve connected to a mercury filled manometer.

From the results as noted above, the following general hypothesis was made.

The load which a tire will carry is fixed by the area of the contact diagram and the inflation pressure of the tire, and is equal to the product of the area in square inches multiplied by the inflation pressure in pounds per square inch. For all practical purposes, it can be considered that the area is the same for equal tire deflections, regardless of the inflation pressure.

but the load carried by the tire will be greater for the same area of contact as the pressure is increased.

The deflection of the tire is principally a flattening of the tread, and bears a simple mathematical relation to the area of contact. The area of contact is an ellipse equal to

$$\frac{\pi A B}{4}$$

where A and B are the major and minor axes of the ellipse.

The length of these axes can be approximated closely from the formula for the chord subtended by the arc of the segment of a circle. The length of the chord is equal to twice the square root of the deflection multiplied by the difference between the diameter and the deflection, or

$$A = 2\sqrt{h\ (d - h)}$$

where "d" for the major axis is equal to the overall diameter of the tire.

"d" for the minor axis is equal to the sectional diameter of the tire.

"h" for both cases is the vertical deflection in inches.

The question of rim design is so closely allied to tire design that one cannot properly be discussed without including the other. The standard airplane rim is a one piece, drop center rim as shown in Fig. 3. This rim is used on the 4, 5, 6, 8, and 12 in. tires. The original 10 in. tire is mounted on a truck type rim. Unfortunately, this rim was developed independently of the other rims, and by a different source, and although it is entirely satisfactory from a performance standpoint, it is different in principle, interferes with oversizing of the tires, and is heavier than necessary for a tire of this size. The development of a 10 in. rim of the drop center type was undertaken and at the present time it is practically complete, and will be adopted as standard superseding the original truck type rim.

The standard drop center airplane rim was the composite design of a number of representatives of wheel and tire manufacturers, and of the Air Corps of the Army, but the principle is not new, having been used in Europe for some years before its adoption in this country.

The various dimensions of the rim for different sizes of section are in accordance with Table III.

TABLE III.
Drop Center Rim Dimension

Size	*A*	*B*	*C*	*D*	*E*	*F*
28 x 4	2.5	.625	.109	.44	.56	.59
30 x 5	2.5	.625	.109	.44	.56	.59
32 x 6	4.2	.75	.109	.56	.69	.71
36 x 8	5.6	1.0	.125	.75	.81	.84
44 x 10	6.0	—	.172	.78	1.06	—
54 x 12	8.4	1.25	.203	.75	.94	.97

Note: These dimensions are not in strict accordance with the dimensions given in the Tire and Rim Association Year Book, but they represent the Air Corps practice with reference to wire wheel installations.

It will be noted that the depth of the well, or drop center, is slightly more than the height of the rim flanges. This is to facilitate the mounting and dismounting of the tires.

The bead seat widths, B, in the table, are so dimensioned that they can accommodate the next larger size of tire when over-sizing. It is true that in some cases the width of the bead of the tire is less than the width of the bead seat on the rim, but service tests have indicated quite conclusively that such a condition does not detract from the performance of the tube or tire.

Pioneer Instrument Co. Publishes House Organ Called "Inside News"

THE PIONEER Instrument Co. of Brooklyn, N. Y., makers of the Earth Inductor Compasses and other standard aeronautical equipment has just announced the publication of a house organ called "Inside News" the first issue of which appeared recently.

Because of the tremendous growth of Pioneer organization, it was formerly impossible for its employees to keep up with the inside news—hence the name. Its pages will recount the activities of the concern.

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Side Slips

By ROBERT R. OSBORN

ADVANCE SPRING FASHIONS FOR AVIATORS

The suggestion that AVIATION should install a "What The Aviator Will Wear" section comes from J. E. W. of Santa Monica, Calif., who admits himself guilty of the social error of having purchased a heavily-lined flying suit and sundry leather jackets for a flying trip to Wichita, Kansas. We can't determine if J. E. W. is in the employ of the Wichita Chamber of Commerce, but we imply from his letter that weather suitable to such clothing never occurs in Kansas. We took the matter up with the Editor and pointed out that if J. E. W. hadn't made these useless purchases he could have taken out a twenty year subscription to AVIATION with the money. The Business Manager overheard our discussion and objected to such a section on the grounds that the excess material could easily be disposed of by a classified advertisement, and therefore, the more people made such mistakes, the merrier. It was finally agreed that we could run some fashion notes once in a while, beginning with this issue. We presume that J. E. W. intended this style and fashion news to be written up in the same manner as it is in the newspapers, and in the magazines devoted to that news,—

* * * *

At a private showing in a hangar at an eatern flying field we saw some of the newest model flying suits from the skilled needle of Mike McGorkings, famous designer of the Longshoreman's Overall Co., just in on the latest boat from Joplin, Mo. My dear, they were simply stunning. One suit had the darlingest pocket in the back especially designed for an eight-inch Stillson wrench, four pounds of waste or an extra Liberty cylinder. Another suit, intended for flying instructors, had a cozy little pocket on the side where the fire extinguisher could be carried, thus saving the instructor from having to reach for the extinguisher on the side of the plane, when a student freezes on to the controls. Of course, as the student gets into further advanced stages the same pocket will take a bottle of ginger ale as snugly as you please.

* * * *

A new device which will soon be indispensable at all of the fields is a pair of rose-colored glasses for the Department of Commerce inspectors who have called to inspect the various air vehicles. These may be obtained in varying degrees of lens strength, depending on the age of the Jennies about to be inspected.

* * * *

The dandiest time-saving scheme for mechanics is the new tailored over-all with small grease and paint containers and daubers mounted on the sleeves, legs and trousers seat. This enables the mechanic to decorate the controls, instrument board, seats and upholstery with grease and paint without requiring his particular attention to that detail. This will save the average mechanic about 50 per cent. of his time, the designer estimates.

* * * *

Our foreign advance agent states that the latest importations of waste and rags from Russia will be very much refined. He states that most of the buttons and barbed wire have been removed and that the painstaking mechanic need have no fear of using it on the most delicate mechanisms. This is, no doubt, in response to the American demand for a high class waste and rag which would not knock off the exhaust manifolds nor break the windows.

FOREIGN NEWS

By Special Arrangement with the Transportation Division Bureau of Foreign and Domestic Commerce

Sweden to Hold International Exhibit

An international aviation exhibition will be held at Goteborg, Sweden, this year from May 17 to 20 under the auspices of the Swedish Aviation Club, states Consul H. C. von Struve, Goteborg, in a report made public by the Department of Commerce. It will be open to foreign land plane and seaplane manufacturers and foreign aero clubs.

The program includes both exhibitions and practical demonstration of flying, as well as competitions in which speed, fuel consumption, stability, etc., of the various makes may be demonstrated. Where proximity to Sweden of the countries participating will permit of participants flying direct to the exhibition, it is also proposed to arrange a race direct to the Goteborg Airport.

According to the promoters, American participation is specially desired, that country's interest in the progress of United States airplane construction having been greatly stimulated by Colonel Lindbergh's successful flights as well as his Swedish descent.

Paris-Argentine Mail Service Opens

Official opening has been announced of the Paris-Argentine mail service utilizing both plane and steamer which was arranged to cut down the long weeks formerly necessary in sending mail between these points. Seven and one-half day service is the aim of the new line.

The Latecoere Co., which operates over the route, first takes mail from Paris to Northern Africa and the Verde Islands by plane, here it is transferred to fast ships which cross the South Atlantic to Fernando do Noronha, an isle off Northern Brazil. Here, the mail is again put aboard a plane to be transported down the South American Coast to the Argentine.

Relief planes have been stationed along the route at vantage points insuring against delay through accident. The Latecoere Co. is under contract to forfeit approximately $2,000 for each suspended trip and $425 for each days delay in arrival at either terminal. Special stamps have been issued for the service.

Italians Use Planes to Fight Malaria

Planes were employed successfully in fighting malaria in the marshes near Furbara, Italy, in recent tests undertaken by the head of the Aeronautic Health Service, the director of the Micro-Biological Institute of Rome, and local agricultural authorities. Paris green was scattered from the planes to kill disease spreading insects while they were yet in the larva stage. With the plan reported a success, it is now intended that the method will be used in many other parts of Italy.

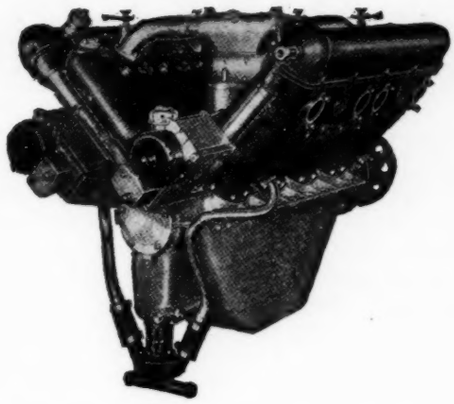
Copenhagen-London Record Set

An air record was lately made when a Fokker Jupiter airplane flew from Copenhagen to London in a non-stop flight of 6 hr. 7 min. duration. The plane had been chartered by Van Lear Black, Baltimore newspaper proprietor, for use in a round trip business journey from London to the Danish city.

New West Indian Service Begun

The airplane Santa Maria recently left Santiago, Cuba, on the first flight of the new air service which has been established between the Cuban city and Santo Domingo, Porto Rico, and Haiti. Passengers and mail are now being carried over the 900 mi. route.

Aircraft Manufacturers & Dealers



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AIRPORTS AND AIRWAYS

Oklahoma City, Okla.

By Ernest W. Fair

Daily airplane service between San Angelo, Tex., and Tulsa by way of Oklahoma City may be established soon if plans of the Wichita Falls Chamber of Commerce are carried out. Members of the Wichita Falls committee were in Oklahoma City in conference with officials here. Their tentative plans call for daily trips each way in four or six passenger planes. This will move the West Texas oil fields closer to Oklahoma City and Tulsa. At present this great producing field is a day and a half from Oklahoma City by rail and but 300 mi. by airline. The distance from Tulsa to San Angelo is 390 air line miles. The present plans call for the organization of a $100,000 corporation and purchase of three planes. One plane each way is to be used with one plane for emergency. They will be tri-engined all-metal monoplanes, probably Ford-Stout.

As the start of an active campaign for a chair of aeronautics at Oklahoma City University, W. S. Key has been named as chairman of the chamber of commerce committee to head this work. Dr. Eugene Antrim, president of the university, will be on the committee. This project was first started when Lindbergh visited the university last October.

Oklahoma City has decided to have an active part in the proposed state air tour now being planned. Roy A. Foster is to have charge of the plans for Oklahoma City's part. This tour is to be a circle air tour of Oklahoma with the purpose of promoting commercial aviation, a questionnaire already having been sent out to all chamber of commerce cities to get information on landing fields and equipment. Date of the air tour is to be set as soon as this data has been collected. Airports of the state will be inspected and rated by experts on the tour. Another effort of the tour is to acquaint the state with the uses of airplanes for passenger, mail, and express transportation and the need for ports and landing fields.

Thomas R. McHenry and other members of the Oklahoma City Chamber of Commerce aviation committee have been working on courtesy card privileges to give visiting airmen. These cards will be sent to all licensed pilots in the country.

Mrs. Charles Martin of Tulsa flew here recently to enact business and returned to Tulsa that night, showing that even women are now using the air route to transact business. She was accompanied by her son James, Mrs. Don Roy, and Mrs. McKay. The trip was made in a Stinson monoplane piloted by Tom Park.

St. Louis, Mo.

By M. L. Alexander

St. Louis will be within 24 hr. air journey from every large city in the country when operations are begun on the proposed new mail routes between St. Louis and Kansas City and St. Louis and Evansville, Ind. The Robertson Aircraft Corp., holder of the St. Louis-Chicago contract, plans to bid on both new routes and another St. Louis concern is also said to be planning to seek the contracts.

Over the St. Louis-Chicago route the volume of mail has increased 15 per cent. since Colonel Lindbergh made his record flight over the line a short time ago. Incidentally, the passenger business has also taken on new activity. An average of one passenger a day has been carried on the line for the past week in open cockpit planes. The operating company plans shortly to order a second Ryan Brougham, and when it is received will use closed planes so that passengers may be carried in street clothing. The open cockpit planes will be used only when the weather is favorable.

Johnnie Campion, dimunitive pilot of the Von Hoffmann Aircraft Corp., who has piled up a fine cross-country record, has a new job. He is going to be pilot for Fred Stone, the comedian, whose enthusiasm for flying has been manifested in the placing of an order for a $9800 Whirlwind Travel Air biplane. Campion is to pilot Stone about during his theatrical season. Stone, a frequent visitor at the field during his visit to St. Louis this winter, selected Campion from among the many pilots he met.

Portland, Ore.

By John W. Anderson

The Rankin School of Flying in Portland has been increasing in size rapidly. It expects soon to challenge the title of Curtiss Flying School on Long Island, N. Y., as the biggest school in the country. The enrollment now is 280.

Three instructors in the Rankin school recently passed their tests leading to granting of transport pilots licenses. They are Lieut. Basel B. Smith, U. S. Navy Reserve, Dick Rankin, and Art Walters. The tests were given by Frank H. Jerdone, new Northwest aeronautical inspector for the Department of Commerce.

"Tex" Rankin. His flying school boasts an enrollment of 280.

Mr. Jerdone also gave special tests to four Rankin students who had finished a 10 hr. flying course. All four, George Fisher and Leo Meadows, Portland; Dick Crane, Seattle; and Paul King, Hoquiam, Wash.; passed and were granted private pilots' licenses.

Mr. Jerdone commends Port of Portland officials highly for their choice of a municipal airport. "One of the beauties of Swan Island is the absence of obstructions," he said.

Les G. Hubble of San Francisco has been appointed to succeed Noel B. Evans as division superintendent of air mail operations of the Pacific Air Transport Co. between Seattle and Medford, Ore. Mr. Evans resigned to become interested in a new aviation school in Medford. C. Eugene Johnson, assistant general superintendent, P.A.T. Co., recently returned to San Francisco after a four weeks' stay in Portland.

Establishment of an upper air observation station in connection with the Portland government weather bureau is sought in a campaign just started by the Aero Club of Ore-

gon, local chapter of the N.A.A. The club requests that the station be set up at the Port of Portland Airport. Officials in Washington, D. C., including the Oregon congressional delegation, have been notified of the club's action by Charles T. M. Echols, secretary.

Jack Parshall, one-time Army flier and formerly pilot for the Bell Line Air Service, has joined the staff of Rankin Flying Service, Inc., as instructor and pilot.

Three carloads of Travel Air biplanes, each containing four planes, have been ordered by the Aeronautical Pursuits Corp., Clarence Farnham, manager, has announced. Several orders for planes are awaiting the arrival of the shipments.

Carl H. Johnston, president of the Prudential Savings and Loan Assn. of Portland, has ordered an American Eagle biplane, according to Arthur Mackenzie, president of the Mackenzie-Goff Aviation Co. Mr. Johnston is now taking a course in flying. As soon as he has obtained a pilot's license he will use the plane in traveling between the Portland and Seattle offices of his company.

Vernon Bookwalter, former chief mechanic of the Pacific Air Transport Co., has also bought a Travel Air biplane from the Aeronautical Pursuits Corp. He plans to operate the machine commercially from the Vancouver, Wash., airport, and may start a flying school there.

"Tex" Rankin flew to Salem, Ore., recently to address the chamber of commerce. While there he inspected the state fair grounds and made suggestions as to proper markings for the field for use as an airport.

Winston-Salem, N. C.

By Robert Carmichael, Jr.

With one Waco already in service and a Fokker Universal to be brought here shortly, Reynolds Aviation of North Carolina, Inc., has made Miller Municipal Airport, Winston-Salem, a real aviation center. Lewis S. McGinnes, formerly at Hadley Field, New Brunswick, N. J., is pilot in charge of the field.

The field is declared by fliers to be one of the best in the South. Recent heavy rains have had little effect upon the ground, as evidenced by the fact that big and little planes have had no trouble landing and taking off. The tri-engined Fokker, "Voice from the Sky" spent several days here recently and the members of the crew voted this field one of the best they had encountered. The big plane was stored in the hangar, this being one of the four hangars they have found large enough to accommodate the Fokker.

J. Shelly Charles, distributor for Eaglerocks in North Carolina, Virginia, and the District of Columbia, has been spending several days here with his dealer, G. R. Pope, at Charles Field on the southern edge of the city. Mr. Charles has just been awarded the Distinguished Service Medal given by Alexander Aircraft Co. in recognition of having performed the most outstanding service of any representative of the company during 1927. One of his feats was that of being the first to reach Spokane in the New York to Spokane air derby held a few months ago.

Mr. Pope now has two Eaglerocks at Charles Field and has delivered one to a customer. He has had his franchise only a little more than a month but is experiencing gratifying business.

Philadelphia, Pa.

The 3rd Aviation Division of the VT-30 Squadron, U. S. Naval Reserve, was awarded the Noel Davis Trophy at a ceremony recently at the Philadelphia Navy Yard. The presentation was made by Rear Admiral Latimer, commander of the Fourth Naval District, and was received on behalf of the recipients by Lieut. Comdr. Robert S. Hedtler, reserve officer in command of the division.

The trophy, a bronze plaque donated to the Navy Department by Harry S. Guggenheim, is awarded annually to the

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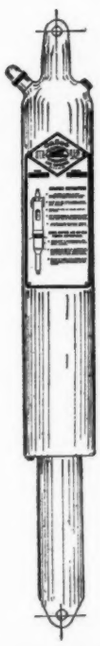

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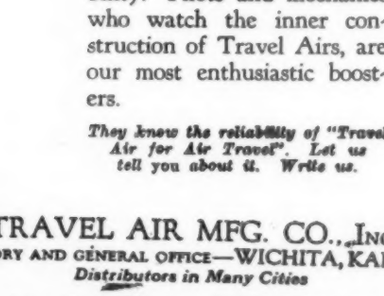

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Navy Reserve division attaining the highest efficiency. When the unit was inspected recently by the Navy Reserve Board the 3rd Division received a rating of 75.14 per cent., the highest of all the 29 units scattered throughout the country. The Division is less than two years old, having been organized Sept. 17, 1926.

Edward E. Felker, president and founder of the University of Pennsylvania Aero Club, recently enlisted in the Army and left the same night for Brooks Field, San Antonio, Tex., where he has been admitted as a cadet. The day before his enlistment he received his honorable discharge from the 103rd Observation Squadron, 28th Division Air Service, P.N.G.

During his brief connection with the University of Pennsylvania Aero Club, Felker accomplished a great amount of work. He was responsible for the interest that was created in the club's activities, for the club's growth from its four original members to more than 100 in less than two months, and for the inauguration of a ground school course in which aviation experts throughout the Philadelphia district have been lecturing.

Deliver Mailwings for New Service

W. Laurence LePage, assistant to the vice president of Pitcairn Aviation, Inc., announced the delivery recently of three of the eight Pitcairn Mailwings (PA-5 with Wright Whirlwind engines) that will be used in the New York-Atlanta air mail service this spring. The planes were delivered to Pitcairn Aviation, Inc., Philadelphia, by the Pitcairn factory at Bryn Athyn, Pa. Delivery of the five other Mailwings is expected soon.

Challenger airplane sales seem to be booming just at present in the Philadelphia area. A recent sale, made by Veale Aviation, Inc., of Hazleton, was to George Zinn, an advanced Pitcairn flying student employed at Pitcairn Field, Willow Grove, Pa. He is storing his plane in the Pitcairn hangar at the field.

From Havana comes word that Charles Townsend Ludington, president of the B.B.T. Corp. of America and the Ludington Philadelphia Flying Service, has arrived in Cuba. The B.B.T. company recently sold to the airport at Havana equipment for the night lighting of its field and hangars. The airport also purchased a beacon.

Thomas A. Budd, registrar and director of personnel for the Wharton School of Commerce and Finance, University of Pennsylvania, has announced that a course in commercial aeronautics has been added to the curriculum of the Wharton School. The course consists of one-half term of air transportation and one-half term of motor transportation.

Most of the trouble in the development of aeronautics is entirely due to faulty and indifferent ground work, Maj. J. Sydney Owens, commander of the 28th Division Air Service, P.N.G., and America's youngest war "ace", told the University of Pennsylvania Aero Club's ground school course students recently in a lecture opening the course.

Pittsburgh, Pa.

By Ray A. Tucker

Recently, the Aeronautics Committee of the Chamber of Commerce, headed by Col. Harry C. Fry, Jr. chairman, acted as host at a luncheon, for P. E. Grosfils, manager for Great Britain of the Air Union, who is now touring this country. Representatives were present from the Aero Club of Pittsburgh, headed by Robert E. Dake, president; C. of C. Airport Survey Committee; McKeesport Chapter of the N.A.A; Rodgers, Bettis, and Mayer's Fields, and the Department of Commerce.

William R. Gardner, president of the Gardner Sign Co., of Pittsburgh, has just purchased a new Eaglerock from John P. Morris, the local distributor. He is flying from Rodgers Field, and has painted the ship for purposes of local business

advertising. Gardner is also applying for a pilot's license from the Department of Commerce, having just graduated from the Morris Flying School.

Pittsburgh capital has taken a new and sudden interest in commercial aeronautics as evidenced by the fact that two distinct groups recently filed applications with the Pennsylvania authorities. One was the Pittsburgh Eastern Airlines Co., 331 Frick Bldg., which filed an application with the State Public Service Commission, asking for a certificate of public conveyance to permit the carrying of passengers by airplane between Pittsburgh, Harrisburg, and Philadelphia. It is planned to operate between Detroit, Pittsburgh, and New York with stopovers at Harrisburg, Philadelphia, and other cities. Four planes have been ordered—a Ford-Stout tri-engined plane and three Stinson-Detroiters—and operation of the lines will begin as soon as they are delivered.

The other group, The Pittsburgh Aircraft Corp., Union Trust Bldg., applied to the State for a charter to conduct a general aeronautical business, but primarily for the purpose of airplane manufacturing.

Lieut. Albert F. Hegenberger, Hawaiian flier, recently spoke at a dinner of the local Massachusetts Institute of Technology Alumni Association at the University Club. The Board of Governors of the Aero Club of Pittsburgh were especially invited guests. Hegenberger told in detail of the preliminary plans of the Hawaii flight and also of the work of the Instrument Section at Wilbur Wright Field.

Springfield, Mass.

By Charles Hanson Gale

Considerable interest has been displayed in the preparations for the launching of the motorcycle courier service in conjunction with the air mail in this valley. The project is being fostered jointly by the Colonial Air Transport and the Indian Motorcycle Co. of this city, and is expected to begin on Mar. 15 as this issue of AVIATION goes to press.

The service is being introduced by these companies to speed up the collection and delivery of air mail posted at Northampton, Westfield, Holyoke, and Springfield.

Postmaster W. Kirk Kaynor of this city has taken an important part in the preliminary plans for the route and the

Carl L. White, veteran cyclist looks over his motorcycle carrier especially built for the new Connecticut Valley air mail feeder line. The cycle system will expedite service.

ceremonies which inaugurated the service. Chamber of Commerce officials have been active also in supporting the project and issuing publicity to business men and manufacturing plants.

The Colonial Western Airways has decided definitely to make this city the eastern terminal for its Cleveland-Buffalo-Albany line, it was recently announced, and negotiations are now being made for airport and hangar facilities. The com-

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pany will not extend its service here unless adequate facilities are available, according to company officials, and local interests are hoping the city will act in that direction at an early date.

Edgar H. Stone of the Springfield Airport Corp. went to New York recently to interview the Colonial officials relative to the use of the Fiske Park commercial airport, which that concern is developing on the northeast side of the city.

Flying operations at the Randall Field of the Eaglerock distributors here have been started on a part time basis. The planes are in the air nearly every pleasant day, and preparations are being made for a busy season. Full schedule flying will start with the arrival of Fred Boots from his home in Iowa where he has been spending the winter. Pilot James A. Hearn, vice president of the Massachusetts Airways Co., has been taking care of the flying this winter.

Airplane Welding Taught

A class in airplane welding has been started at the Springfield Ground School operated by Lieut. Elzor Hall, and an intensive course in engines and airplane construction has been started for a group of students attending in the afternoon.

The first delivery on the order of 16 Eaglerocks to the Massachusetts Airways of this city was made recently and further deliveries are coming in weekly. The machines are being shipped by freight for assembly and flight test at Randall Field. Demonstration flying is being done now at this field for the benefit of prospective buyers.

Harry Hermann of Springfield Airlines has returned from an extensive tour of some of the manufacturing plants in the middle West. He included visits to the Swallow plant at Wichita and the American Eagle plant at Kansas City, both of which his company represents in New England. Harry is setting up a plane at Dunn Field in preparation for the spring flying and sales work. He has 20 Swallows on order.

Lieut. Albert G. Glode of the Springfield Airport Corp. has been speaking to local civic clubs recently on aviation subjects. He has urged the need of an airport and described the work being carried on by his company at Fiske Park. Lieutenant Glode has been the chief instructor at the ground school operated by the company.

Oakland, Calif.

The Goldman State Aircraft Co. here is giving free lectures on flying every Friday evening. From 75 to 100 air enthusiasts turn out to these meetings, and several of them have already signed up in the regular aeronautical school course.

W. G. Herron, vice president of the Boeing Air Transport Co., recently gave an illustrated lecture before the group, on commercial transportation. Besides visiting officers from Crissy Field, who often talk on subjects in which they are specialists, the regular instructors of the Golden State School of Aviation take up theory of flying, navigation, plane and engine construction, etc. Among the school pilot-instructors are Martin Jensen, Honolulu flier, Capt. Geo. D. Ream, Capt. Ienar E. Ream, and D. A. DiFiore.

Flying lessons are also broadcast over radio station KTAB every Tuesday and Thursday evening at 7:13. Mr. Jensen has already delivered several talks, telling of actual flying conditions and technique, and also of some of his experiences in barnstorming and flying across the Pacific. Other instructors rotate with Mr. Jensen before the microphone.

Oakland is to be officially represented at the All-American Aircraft Show which will be held in Detroit, April 14 to 21, inclusive.

Herbert Thaden, designer and builder of metal aircraft, is planning to send the "Argonaut", first metal plane built in the West, on a "barnstorming" demonstration tour of the

United Statees. Seven or eight passengers will be carried on the trip, according to Thaden.

To signal the arrival and departure of air mail planes and to clear the field quickly in case of emergency, a siren is to be established on top of the airport administration building. Controls for the siren will be in the superintendent's office.

Air mail pilots recently pulled a couple of "fast ones", aided and abetted by a strong tail wind. James Rutledge, Pacific Air Transport Co. pilot, flew his plane from Medford, Ore., to Oakland in 2 hr. 15 min. The air-line distance between the two points is 335 mi. Clair K. Vance piloted his Boeing biplane in from Reno, a distance of 175 mi., in 1 hr. 20 min.

Atlanta, Ga.

By John K. Ottley, Jr.

Thousands of visitors were attracted to Candler Field recently by an unusual assemblage of planes from widely-separated parts of the country. Two of the largest type of planes manufactured and one of the smallest were to be seen. Five Keystone bombers, carrying a personnel of 24, were at Candler Field for a Sunday after making a tactical flight from Langley Field, Va. The bombers, using Candler Field as a base, flew over Atlanta at night and gave the city its first real exhibition of night flying, dropping a number of flares over the center of the city.

The other giant plane landing at Candler Field was The Texas Co.'s new Ford tri-engined monoplane, piloted by Capt. Frank M. Hawkes, which stopped-over for two days en route to the home office of the company at Houston, Tex., and carried a large number of prominent Atlantians as guests on flights over the city and surrounding country.

The baby plane which formed a vivid contrast in size when rolled beside the Ford and Keystone Bomber was an American Moth plane weighing approximately 600 lb. and piloted by Pat Love.

The Moth plane with two Wacos is making a tour of the Southeast sponsored by the Portsmouth, O., Chamber of Commerce to advertise products manufactured in Portsmouth, which include the Moth plane. When the plane is put in production its manufacturers plan to put the tiny monoplane on sale at around $1,500.

Endicott, N. Y.

The Endicott Aero Club, which had its inception in August, was organized in September with 65 members. The club laid out a flying field on the edge of the village, and now, with the approach of spring, a hangar capable of housing four planes has been erected. The airport is to hereafter appear on government maps.

Announcement has been made that an air meet will be held at the field when the spring season opens. Stewart Wheeler, naval aviator during the World War, Hugh F. Duffy, Stewart Newing, and Ralph H. Gardner are to be in charge.

Gardner was the prime mover in the organization of the club. George W. Johnson, vice president of the Endicott-Johnson Corp., donated the field. The club bought a portable school house from the village, erected and enlarged it with the aid of the members, and is now prepared to welcome a large crowd in the spring.

Stewart Wheeler is first president; Hugh L. Holliday, secretary; and Earl L. Brown, treasurer. The board of governors consists of J. R. Allen, George W. Johnson, Ralph H. Gardner, Hugh F. Duffy, Stewart Newing, Halbert A. Cornell, Dr. W. T. Anderson, and Edward B. Furry.

Detroit, Mich.

By John T. Nevill

Capt. Dieudonne Costes and Lieut. Comdr. Joseph Lebrix stopped at Detroit on their cross-continent flight to San Francisco. While here, their Breguet biplane, Nungesser-Coli, was wheeled into the main hangar alongside other world fa-

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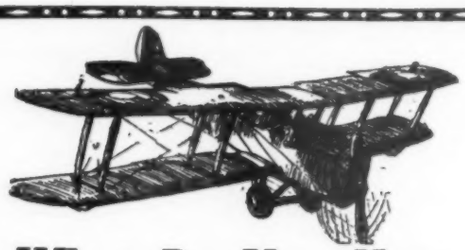

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mous planes such as Commander Byrd's Fokker monoplane, Josephine Ford, the Stinson monoplane, Pride of Detroit, and the original Ford "flivver" plane.

An informal breakfast was given for the fliers next morning before their flight to Chicago. Among those attending the breakfast were Edward F. Schlee, William S. Brock, William B. Mayo, Paul Strasburg, Ray Collins, and E. E. Kramp of the Detroit Board of Commerce.

Comdr. C. D. Burney, M.P. of Oxbridge, Eng., and head of the Airship Guarantee Co., builders of the nearly completed R-100, 100 passenger British dirigible scheduled to begin a trans-Atlantic passenger service next September, was a recent Detroit visitor.

Burney came here to inspect the mooring mast at the Ford airport, with a view toward bringing his giant airship here following completion of the initial east to west flight in September.

Dallas, Tex.

By Rorie Cowden

C. W. Cahoon, Jr., former president of the Dallas Flying Club, was a recent guest of the club at its weekly luncheon. Mr. Cahoon went to Wichita Falls from Dallas and is now actively engaged in aeronautics in that city. He outlined the methods used in establishing an airport in Wichita Falls which will later be operated as a municipal airport. They are now planning on interesting some reliable air transport line into operating a line through North Texas and Southern Oklahoma. Should they be unable to secure a line which is already established they plan to organize and operate one in cooperation with the other cities which will be served by the line.

It was recently voted to send a letter of congratulations to Houston on the opening of that city's municipal airport which was dedicated Mar. 2. Texas' municipal airports are now increasing with great speed.

Howard Woodal of the Travel Airways, state distributor of the Travel Air, reports exceptionally good business during January and February, sales for those months being 20 Travel Air planes. Howard made a trip recently in his OX5 Travel Air in which he covered more than 1400 mi. in two days of daylight flying.

Tempe, Ariz.

By C. B. Wivel

The Tempe Civic Club of Tempe, Ariz., has just erected a 24 in. General Electric airport revolving beacon. This standard beacon will light up the air from sunset to sunrise each night of the year.

Tempe is particularly favored by a butte over 300 ft. higher than the level of the streets of the town, and on the top of this the beacon has been erected. The light is attached to an iron framework 20 ft. above the topmost point of the butte. A concrete base set in rock forms a support.

In the opinion of Army fliers, the Tempe light will be visible at least 60 mi. It will give direct aid to pilots in obtaining bearings for landing in the municipal and commercial airports nearby. This beacon replaces a smaller light, long a land mark in Tempe.

Mankato, Minn.

An aviation committee has been formed in this city and is now working on the project of securing a suitable landing field for the community. Appointments to the group have been made in part by Charles T. Taylor, president of the local chamber of commerce. Taylor has enthusiastically backed the idea of an airport.

Careful consideration is now being made, states G. M. Davis, secretary and manager of this civic organization, of the financing and acquiring of property involved in the plan the committee favored.

UNITED STATES AIR FORCES

Graduate 44 from Primary Flying School

Of the class of students undergoing training at the Primary Flying School, Brooks Field, San Antonio, Tex., 44 graduated early this month and are now scheduled to take up further training at the Advanced Flying School at Kelly Field.

The list of graduates includes four officers from other branches of the Army who were detailed to the Air Corps, seven Air Corps Reserve officers, one enlisted man of the Air Corps, two National Guard officers, two officers of the Peruvian Army, and 28 Flying Cadets. The graduates follow:

REGULAR ARMY
Maj. William O. Ryan, Field Artillery; First Lieut. James F. Phillips, Corps of Engineers; Sec. Lieut. George V. Holloman, Infantry; Sec. Lieut. James S. Stowell, Infantry.

ARKANSAS
Flying Cadet Joseph S. Bartles, Fort Smith.

CALIFORNIA
Sec. Lieut. Lawrence H. Chiappino, Air Corps Reserve, San Jose; Sec. Lieut. Howard B. Cock, Air Corps Reserve, Tustin; Flying Calet Joel E. Mallory, Santa Rosa.

COLORADO
Flying Cadet Edwin R. French, Englewood.

DISTRICT OF COLUMBIA
Sec. Lieut. Lloyd H. Tull, Air Corps Reserve, Washington.

FLORIDA
Sec. Lieut. Frederick E. Glantzberg, Air Corps Reserve, Jacksonville.

ILLINOIS
Sec. Lieut. Paul E. Shanahan, Air Corps Reserve, Mt. Vernon; Tech. Serg. Pall A. Jackson, Chanute Field, Rantoul; Flying Cadet Leland C. Brown, Granite City.

INDIANA
Flying Cadet Alfred E. Kelberer, Lafayette.

IOWA
Flying Cadet Cassius H. Thomas, Traer.

KANSAS
Flying Cadet Ralph O. Brownfield, Independence; Flying Cadet Robert E. L. Pirtle, Manhattan.

MASSACHUSETTS
Flying Cadet George C. Price, Lowell.

MICHIGAN
Flying Cadet James N. Peyton, Detroit; Flying Cadet Paul B. Wurtsmith, Detroit; Flying Cadet Myron E. Zeller, Ann Arbor.

MISSISSIPPI
Flying Cadet Isaac W. Ott, Osyka.

MISSOURI
Flying Calet William V. Pierce, Carthage; Flying Cadet Kenneth A. Rogers, Columbia.

NEBRASKA
Flying Cadet Donald M. Broughton, Hastings.

NORTH CAROLINA
Flying Cadet Charles E. Bradshaw, Charlotte.

NEW YORK
Flying Cadet Trevor Kenyon, Brooklyn; Flying Cadet William A. R. Robertson, New York City.

OHIO
Flying Cadet Kenneth A. Cool, Cleveland; Flying Cadet Fred A. Pillett, Springfield.

OKLAHOMA
Sec. Lieut. Eugene H. Rice, Air Corps Reserve, Oklahoma City; Flying Cadet Joel G. Pitts, Oklahoma City; Flying Cadet Ronald R. Walker, Newkirk.

PERUVIAN ARMY
Lieut. Guillermo Concha; Lieut. Manuel E. Escalante.

PHILIPPINE ISLANDS
Flying Cadet Clair E. Bonner.

TENNESSEE
Flying Cadet Charles S. Vaugh, Nashville.

TEXAS
First Lieut. Earle T. Showalter, Texas National Guard; Sec. Lieut. LeRoy Hudson, Air Corps Reserve, Lancaster; Flying Cadet Stewart P. Wright, Dallas.

WASHINGTON
Sec. Lieut. Edward H. Porter, Washington National Guard, Spokane; Flying Cadet James S. Henderson, Seattle; Flying Cadet Roger V. Williams, Spokane.

Five Army Pilots Honored

Five aviators have been honored with the Distinguished Flying Cross, according to a War Department announcement. They are Capt. John A. Macready and Lieut. Oakley G. Kelly, who made the first non-stop New York-San Francisco flight, May 2-3, 1923; Lieut. Arthur C. Goebel, who flew from Oakland, Calif., to Honolulu, Aug. 16-17, 1927; Lieut. Russell L. Maughan, flier who flew in a New York-San Francisco dawn-to-dusk flight, June 23, 1924; and Capt. Hawthorne C. Gray, who reached a record altitude of 42,470 ft. in a balloon ascension Nov. 4, 1927, only to die when he accidently severed his oxygen tube. His is a post humous award.

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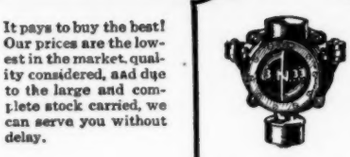

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Former Army instructor and Flight Commander—J.M.A. Rating 700 hours. Transport license. Available soon. Permanent position preferred. Experienced instructor, night flying and cross country. E. J. Morrissey, 562 Fenton Ave., Aurora, Ill.

Man with ten years aeronautical experience desires connection with reliable aeronautical concern. Any location. Best references. Box 812, AVIATION.

Mechanical engineer, age 27 years, German college graduate. 7 years shop experience, 3 years drafting experience, desires position in airplane industry. Prefer good future to high salary start. W. Herdt, 100 Park Ave., Sellersville, Pa.

Young man 22 wants position with aircraft company in New York or vicinity. Have completed course in practical aeronautics. Reliable. David Horton, Greenville, N. Y.

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